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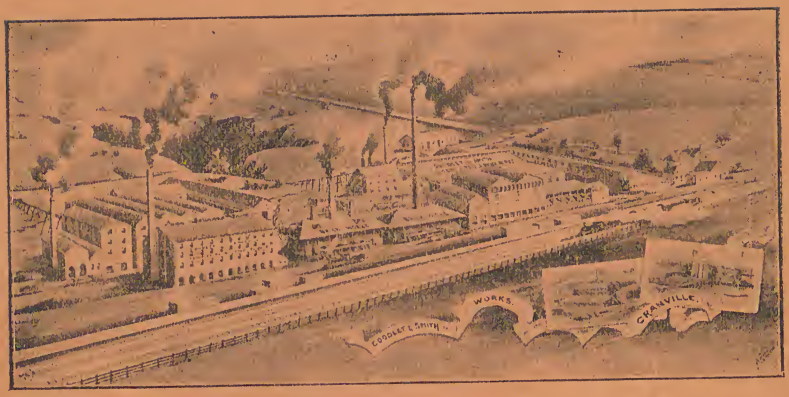


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OF

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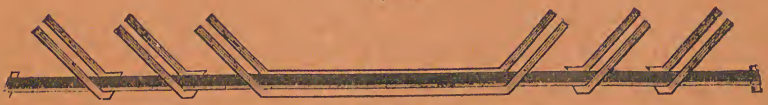

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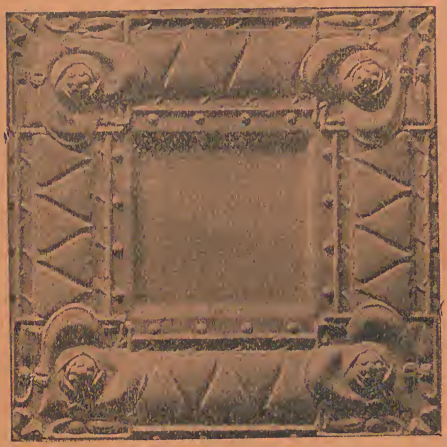

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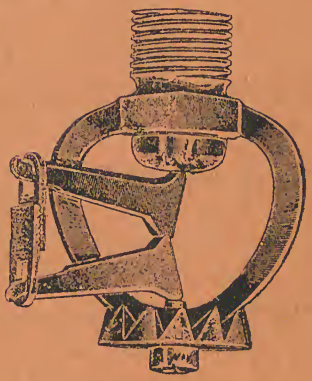

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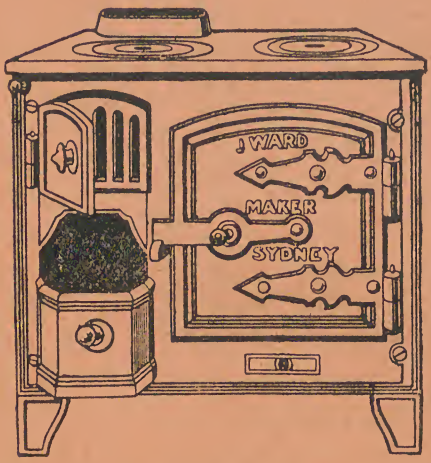


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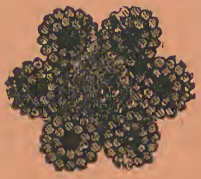

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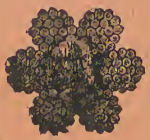

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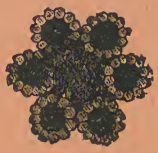

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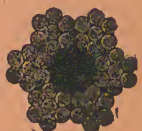

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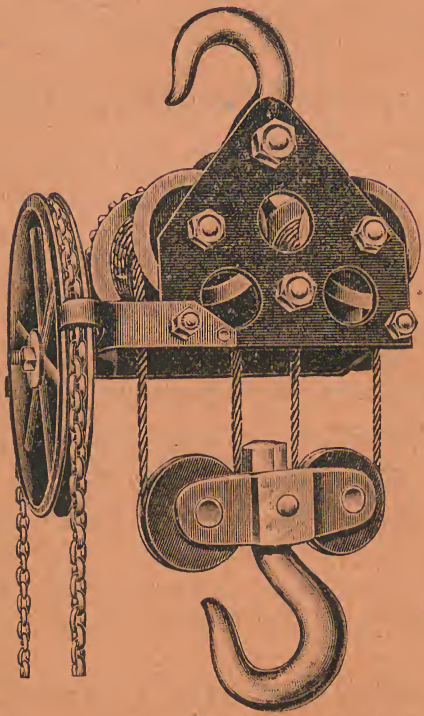

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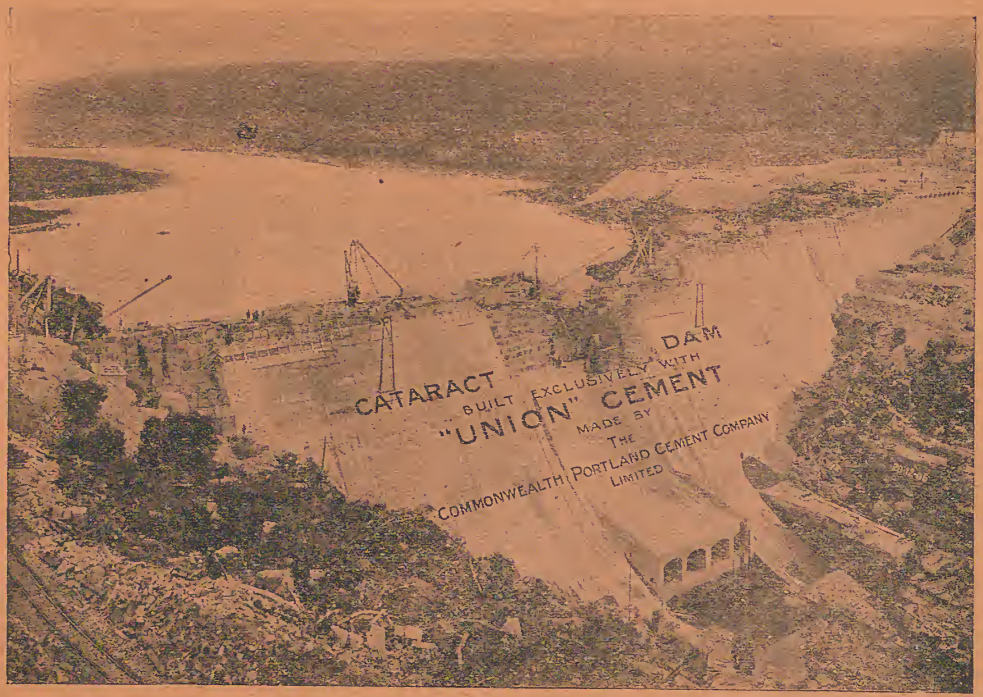

THE AUSTRALIAN

# BUILDERS & CONTRACTORS' PRICE BOOK.

SEVENTH EDITION.

REVISED AND ENLARGED.

BY

C. E. MAYES,

*Builder and Government Contractor.*

---

PUBLISHED BY E. W. COLE,

BOOK ARCADE, SYDNEY, MELBOURNE AND ADELAIDE,

And may be obtained from all Booksellers.

1908.

WHITE-SIMMONS PRINTING COMPANY,
DRUITT & KENT STREETS, SYDNEY.

# PREFACE.

In preparing this, the seventh edition of "Mayes' Builders and Contractors Price Book," I have carefully studied the convenience of my readers in affording facility for quick reference to all information by arrangement of subjects and also by index. The sets of new tables, carefully worked out and checked, will also save time in estimating.

The prices for materials will be found correct at the time of publication, but are liable to fluctuation by the inevitable law of supply and demand.

The prices of labour are reckoned at the current rate of wages, namely, one shilling and three pence per hour for artisans, except otherwise stated, and one shilling per hour for labourers.

The prices of plant and tools used by various contractors, as well as those in the building trade, will be a useful reference.

Legal notes relating to Australian contracts, employers, architects' agreements, and building generally, written expressly for this Edition, will, I feel sure, be found useful to my readers.

The New South Wales Government Schedule of prices has been taken as the basis of prices in the summary under different trade headings, calculated on the current rates of labour and materials, and are given as a gude only.

**Fixed prices with similar profit adapted to all circumstances are impossibilities.**

The **cost** prices under favourable circumstances are therefore given, leaving to the contractor to add what he considers a fair allowance for incidental expenses and for profit as the locality and circumstances warrant.

Any reference made to names of agents, manufacturers, or brands is only for the convenience of contractors, and not **intended to advertise any particular kind or description** of building material or contractors' plant.

The **chief** value of a price book is as a book of **reference,** where the average or standard prices obtainable can be ascertained and is thus both a guide to and also a check upon contractors' own current prices and methods.

In revising this work the most reliable standard authorities have been consulted, and every means has been taken to secure accuracy.

The Author will be pleased if his readers will make any suggestions which are considered of importance to the Building Trade, to be incorporated in a future edition, as it is desired that the work shall be as useful and complete as possible for the benefit of those for whom it is published.

In conclusion, I have to thank those who have rendered me valuable assistance in preparing this work.

C. ERNEST MAYES.

Paddington,
Sydney.

# CONTENTS.


| | PAGE |
|---|---|
| Artesian Wells .. | 247-254 |
| Asphalte Floors, Roofs, Roads .. .. | 84-85 |
| Ballast and Metal .. | 82-83 |
| Belting .. .. .. | 264 |
| Blasting and Explosives | 48-51 |
| Blinds .. .. .. | 246 |
| Blocks and Ropes.. | 259-263 |
| Boring for, various systems | 247-248 |
| Bricklayer .. .. | 90-97 |
| Brisbane Prices .. | 304-308 |
| Building Materials of Colonies .. | 282-324 |
| Building Laws and Regulations .. | 326-343 |
| Building Materials & Trees— | |
| N.S.W. .. .. | 282 |
| Victoria .. .. | 298 |
| South Australia .. | 319 |
| Queensland . .. | 309 |
| Tasmania .. .. | 321 |
| N.Z. . .. .. | 323 |
| Carpenter .. .. | 114-127 |
| Cement and Concrete | 71-76 |
| Centering .. .. | .. 76 |
| Chains and Ropes.. | 259-263 |
| Concrete Reinforced | 77-81 |
| Diamond Drilling.. | 255-256 |
| Drainer .. .. | 43-47 |
| Dredging .. .. | .. 41 |
| Drilling Machine .. | 257-258 |
| Electrical .. .. | 212-218 |
| Excavator .. .. | 28-43 |
| Fences and Gates (patent) | 210 |
| Gas Fitter .. .. | .. 172 |
| Glazier .. .. | 232-235 |
| Heating Appliances | .. 236 |
| Hot Water Fitter .. | 177-179 |
| Ironmonger . .. | 240-245 |
| Joiner .. .. | 128-143 |
| Legal Notes .. | 344-356 |
| Lighting, Heating, Fire-resisting .. | 236-239 |
| Marble Mason .. | 68-70 |
| Masonry .. .. | 53-67 |
| Metal Worker .. | 201-206 |
| Monier Concrete .. | 80-81 |
| Mining Tunnelling | 36-37 |
| Memoranda, Useful | .. 357 |
| Melbourne Price List | 292-297 |
| Paints and Painter | 219-227 |
| Paperhanger .. | 228-231 |
| Plant and Tools .. | 269-274 |
| Plasterer .. .. | 152-161 |
| Plumber .. .. | .. 162 |
| Pumps .. .. | 265-268 |
| Quantities & Measurements | 17 |
| Quarrying .. .. | 52-55 |
| Road-making .. | 88-89 |
| Ropes, Chains, and Blocks | 259-263 |
| Rock-drilling .. | 257-258 |
| Slater and Tiler, Shingler | 105-108 |
| Strength and weight of building materials | 23 to 28 |
| Smith and Founder | 181-200 |
| Street Paving .. | 88-89 |
| Tables, Useful .. | 357-360 |
| Terra Cotta .. | .. 102 |
| Tiler . .. .. | .. 103 |
| Timber Merchants Lists | 144-151 |
| Weights and Measures | .. 359 |
| Well-sinker . .. | .. 247 |
| Wire-worker .. | 207-211 |
| Writer and Decorator | .. 225 |
| Zinc-worker . .. | 202-203 |

# INDEX.


| | PAGE |
|---|---|
| Abutments, brick | 94 |
| Acanthus leaf | 62, 63 |
| Acetylene Gas | 225, 236 |
| Acre of land Table | 35 |
| Ægypto paving | 85, 159 |
| Agricultural pipes | 45 |
| Air bricks, terra cotta | 97 |
| ,, Compressors | 258 |
| Aluminium | 199 |
| Alluvial boring | 248 |
| Amperes, to compress air | 255 |
| American redwood | 102 |
| Angle of rest | 27 |
| Angle and T iron | 189 |
| Angles with 2 feet rule | 100 |
| Anaglypta papers | 234, 235 |
| Arches, gauged | 95 |
| Architraves, wood | 139, 140 |
| ,, cement | 119 |
| Areas of circles | 19 |
| Arkilite paving | 85, 159 |
| Arris Rails | 109 |
| Artesian drains | 47 |
| ,, wells | 247 |
| ,, ,, tubes for | 254 |
| ,, ,, cost & weight of plant | 253 |
| ,, boring poles | 250 |
| Armoured fire doors | 239 |
| Asbestos stoves | 172 |
| ,, cement | 106 |
| Asbestic plaster | 154 |
| Ashlar masonry | 58 |
| ,, stone | 53, 57, 58 |
| Asphalte | 84 to 86 |
| ,, water pipes | 47 |
| ,, joints to drains | 47 |
| ,, paint | 85 |
| ,, floors, paths, &c. | 85 |
| ,, seyssel | 84 |
| ,, paper, roofs, &c. | 84, 85 |
| Aust. building stones, weight of | 25 |
| Aust. flagging, weight of | 25 |
| Australian timber strength of | 314 |
| ,, timber falling of | 79 |
| ,, timber, weight of | 25 |
| Austral window balance | 242 |
| Automatic closing gates | 210 |
| ,, spraying machines | 225 |
| Bakers' oven material | 96, 97 |
| ,, ,, iron fittings | 198 |
| Balconies, ironwork, &c. | 165, 183 |
| Balcony and ver. complete | 194 |
| Ball, in stone for finial, &c. | 60 |
| Ballast, or rōad metal | 81 |
| Balusters, cement | 157 |
| ,, and newels | 136, 137, 143, 148 |
| ,, iron, and metal | 183, 192 |
| ,, stone | 61 |
| ,, Terra cotta | 102 |
| Baltic and red pine | 109 |
| Bar and rod iron, weight of | 182, 187 |
| Barge boards | 106, 147 |
| Basalt or bluestone road metal | 82, 282 |
| Basins and plugs | 173 |
| Baths, various | 173, 175, 177 |
| Battening, shingling, &c. | 107 |
| Beams, breast summers, &c. | 119 |
| ,, reduced to superficial | 100 |
| Bedding, frames | 96, 128 |
| Beech, English, strength of | 187 |
| ,, Colonial | 285 |
| Bell hanging | 180, 215 |
| Belting, machine | 263, 264 |
| Belt laces | 263 |
| Bevelled bricks | 99 |

| | PAGE |
|---|---|
| Bevelling glass | 299 |
| Bitumen blocks | 47, 84 |
| ,, Solution | 226 |
| Blackwood | 019, 110 |
| Blasting and explosives | 48 to 51 |
| ,, rocks, quarrying | 52 |
| ,, powder, required | 51 |
| ,, by electricity | 50 |
| ,, snags in rivers | 55 |
| Blinds, window, various | 246 |
| Blocks, pulley, various | 262, 263 |
| ,, travelling deferential | 263 |
| ,, wire rope sheave | 261 |
| Block tin and composition pipes | 167 |
| Bloodwood | 286 |
| Bluestone quarrying, &c. | 53, 64 |
| ,, N. S. Wales | 282 |
| ,, steps | 53, 64 |
| ,, road metal and screenings | 82, 83 |
| ,, sets for paving | 53 |
| ,, sawn & squared | 53, 64 |
| ,, curbing | 53, 161 |
| ,, channelling | 64 |
| ,, landings, Vic. | 64 |
| ,, Launceston | 53 |
| Boards to superficial table | 124 |
| Boilers, hot water | 177 |
| Bolts, door and gate | 246 |
| ,, weight of 100 | 186 |
| Bolt heads and nuts | 182 |
| Boring, Alluvial | 248 |
| ,, Artesian well | 247 |
| ,, for water | 247 |
| ,, diamond drills | 255, 256 |
| ,, Abyssinian tube wells | 247 |
| ,, Felsite | 248 |
| ,, the Tiffen borer | 248 |
| ,, rock drills, various | 257 |
| ,, and pumping to surface | 250 |
| ,, prospecting | 248 |
| Bostwick's Collapsible gates | 193 |
| Box frames for sashes | 130, 151 |
| Box, Aust., strength of | 280, 281 |
| Box, Austral. | 286 |
| Box Girders, W.I. | 192, 195 |
| Brass cocks, water or steam | 176, 179 |
| Brass and copper | 26, 200 |
| ,, sheet | 200, 201, 205 |
| ,, stair treads | 205 |
| ,, tubing | 176 |
| ,, wire netting | 207 |
| Brackets, iron | 183, 192 |
| Bracketing for cornices, &c. | 121 |
| Breaking stone for concrete | 82 |
| Bricklayer | 90 to 101 |
| Bricklayers' materials and cartage | 97 |
| ,, sundries | 96 |
| Brick drains | 43, 95 |
| Bricks, number required | 91, 92, 95 |
| ,, terra cotta | 102 |
| ,, weight of | 26 |
| Brickwork in cement | 93, 94 |
| ,, in arches | 94, 121 |
| ,, at Sydney and Melbourne | 96 |
| ,, faced with O.K. bricks | 92, 93 |
| ,, rod of contents | 90, 91, 92 |
| ,, rod and cubic yd. | 92, 94 |
| ,, measurement of | 90, 99 |
| ,, hollow or cavity | 94, 93 |
| ,, bonding for | 92, 93 |
| ,, garden wall | 94 |
| ,, cost of | 93, 96 |
| ,, foundations | 94 |
| ,, underpinning | 96 |
| ,, per super. foot | 95 |
| ,, table of | 100, 101 |
| ,, taking down, &c. | 94 |
| ,, in bridges and culverts | 94 |
| ,, pointing | 93, 95 |
| ,, in small lofty piers | 94 |
| ,, beams in cement | 92 |
| ,, in tanks and shafts | 99 |
| ,, in ovens, coppers | 94-96, 97 |
| ,, in paving | 91, 95 |
| ,, labour only | 94, 95 |
| ,, table for cost of | 101 |
| Bridge castings | 183 |
| ,, planking | 119 |

| | PAGE |
|---|---|
| Bridges, abutments | 94 |
| ,, timber | 118 |
| ,, wrought iron girder | 195 |
| ,, laminated | 119 |
| Brisbane sandstone 58, 61, | 304 |
| ,, building material | 304 |
| ,, doors and sashes | 308 |
| Bronzework | 205 |
| Buchan traps | 44 |
| Building excavation | 32 |
| ,, By-laws & Acts | 326-340 |
| Building materials, weight | 25 |
| ,, strength | 23 |
| ,, Adelaide | 319 |
| ,, Tasmania | 321 |
| ,, Brisbane | 304 |
| ,, N. Zealand | 323 |
| ,, Victoria | 292-300 |
| ,, N.S. Wales | 283 to 291 |
| Builders' ironmongery | 240 to 246 |
| Buttresses, cost of stone | 58 |
| ,, brickwork | 94 |
| Cantilevers or trusses | 62 |
| Canvas hose | 180 |
| Capacity of tanks | 24 |
| Capitals & bosses, plaster 138, | 142 |
| ,, stone, &c. 60, | 62 |
| Carpenter, bush | 117 |
| Carpenters' work | 114 to 123 |
| ,, measurement 114, | 128 |
| Carting building stone | 54 |
| ,, building materials | 97 |
| Cartage, per mile | 97 |
| ,, per ton 32, | 54 |
| ,, post and rails | 118 |
| ,, sleepers | 116 |
| Carting earthwork | 32 |
| Carving in stone 62, | 63 |
| ,, in wood 131, | 224 |
| Casements 129, | 150 |
| ,, steel | 193 |
| Casting, statues | 187 |
| Castings in plaster 157, | 158 |
| ,, weight of, from pat. | 181 |
| ,, copper and zinc 199, | 200 |
| ,, brass and bronze | 205 |
| ,, cement | 157 |
| Cast-iron down pipes | 163 |
| ,, spouting and heads | 291 |
| ,, water pipe | 183 |
| Castlemaine slate 65, | 300 |
| Cedar, where found 288, | 312 |
| Cathedral glass work | 230 |
| Cedar doors, cost of | 133 |
| Ceilings, flowers 158, | 160 |
| ,, groined, &c. | 121 |
| ,, panelled plaster | 160 |
| Cement colouring | 72 |
| ,, drain pipes | 46 |
| ,, castings, blocks 72, | 158 |
| ,, for iron joists 194, | 206 |
| ,, test of Portland | 24 |
| ,, Portland 24, 71, | 152 |
| ,, Keene's 26, 156, | 157 |
| ,, concrete 71, | 74 |
| ,, and coke concrete | 74 |
| ,, weight of | 72 |
| ,, Victorian | 298 |
| ,, stucco 153, | 156 |
| Centfriugal pumps | 268 |
| Centering, wooden 76, 79, | 121 |
| Centre flowers 62, 158, | 160 |
| Channel drain pipes | 44 |
| Channelling Bluestone | 64 |
| ,, Machines | 55 |
| ,, Sandstone | 32 |
| Chains and ropes 259, | 262 |
| Chemists' lamp | 172 |
| Chimneys, iron gal. | 296 |
| Chimney pieces, marble | 70 |
| ,, ,, enam. slate | 65 |
| ,, pots 102, | 157 |
| ,, shafts, concrete | 81 |
| ,, ,, soot proof | 97 |
| Chimneys, factory, &c. 81, | 94 |
| Choosing trees for splitting | 116 |
| Chunam (shipwrights) | 226 |
| Church pews, seats, ventilators, &c. | 141 |
| Circular tanks | 99 |
| Circular work in stone | 61 |
| Circumferences of circles 19, | 358 |
| Cisterns for W.C.'s | 165 |
| Clamps, mortised wood | 133 |
| Cloisonne Glass | 231 |
| Closet, Automatic earth | 174 |

| | PAGE |
|---|---|
| Closet Pans, Pedestal | 173, 174 |
| ,, seats | 173 |
| Clay puddle per cubic yard | 83 |
| Coal, getting and raising | 32 |
| Coach house doors | 134 |
| Cocks, brass, for water or steam | 171, 176, 179 |
| Collapsible gates | 193 |
| Coins, measure and weight | 358 |
| Coke for concrete, &c. | 74, 83 |
| Colouring, outside | 226, 227 |
| ,, kalsomine and distemper | 225 |
| Columns, granite | 62 |
| ,, iron, cast | 183 |
| ,, galvanised iron | 197 |
| ,, and pilasters, wood | 137 |
| Composite enrichments | 156, 158 |
| Composition | 167, 168 |
| Compound girders | 195 |
| Concentration table ripples | 153 |
| Concrete chimneys | 81 |
| ,, drain pipes | 46 |
| ,, floors, centering | 121 |
| ,, footings | 79 |
| ,, gutters | 161 |
| ,, labour only | 74, 75 |
| ,, mixing machinery | 73 |
| ,, re-inforced floors | 75, 79 |
| ,, re-inforced systems | 77 |
| ,, street foundations | 89 |
| ,, various | 74 |
| ,, walls | 75 |
| ,, blocks | 72 |
| ,, coke for arches | 74, 83 |
| Contractors' pumps | 265 |
| Cooking ovens and stoves | 238 |
| Coping cement | 159 |
| ,, stone | 57, 67 |
| Copper and its alloys | 199 |
| ,, bar and sheet | 205 |
| ,, cord for windows | 201 |
| ,, conductors, lightning | 206 |
| ,, clamps for marble | 70 |
| ,, pipe | 177, 205 |
| ,, stamped | 205 |
| Coring, stone and slate | 65, 66, 67 |
| Cornices, gothic, pine | 137 |
| ,, fibrous plaster | 160 |
| Corrugated iron | 163 |
| ,, rolled glass | 229 |
| Counter shafts and pulleys | 270 |
| Covering power of plaster | 154 |
| Cowls, gal. iron ventilating | 165 |
| Copper boilers | 177, 238 |
| Cornices | 153, 156 |
| Counters, wood | 133 |
| Cradling for cornices, &c. | 138 |
| Cranes | 262 |
| ,, hand, electric and steam | 217, 218, 270 |
| Crab winches | 270 |
| Cubic measure | 28 |
| ,, and superficial concrete | 76 |
| Cubing for estimating | 18 |
| Cubes, or paving stones | 53, 89 |
| Culverts, stone or brick | 58 |
| Curbs for footpaths | 53, 161 |
| Curb and guttering | 57, 64, 66, 161 |
| Curving iron corrugated | 165 |
| Cuttings and embankments | 33, 34 |
| Cutting glass tubes | 229 |
| Damp-proof course, various | 85, 87, 97, 106, 168 |
| ,, papers | 87, 233 |
| Decorative wall pulps | 235 |
| Decimals and their equivalents | 42 |
| Dentules in stone | 60 |
| Derrick or poppet head | 253 |
| Diameter of circles | 19 |
| Diamond drill boring | 256, 257 |
| Dimension or cube stones | 56 |
| Distemper and colouring | 222, 225 |
| Diving apparatus | 180, 198, 206 |
| Dobbin carts, easily filled | 33 |
| Domes in brickwork | 99 |
| Doors and casements | 129, 132 |
| ,, and frames | 96, 122, 145, 149 |
| ,, checks and hinges | 243 |
| ,, fire-resisting | 239 |
| ,, gauze fly | 246 |
| ,, rollers and hangers | 245 |
| ,, and fanlights | 139 |
| ,, and windows, Gothic | 141 |
| Door jambs | 128, 145, 140 |
| ,, linings | 131 |

PAGE

Door holder, automatic .. 243
,, springs, patent 242, 243
,, furniture .. .. 245
Down pipes .. 163, 164, 165
Drain making .. .. 47
,, Monier plate .. .. 80
,, pipes, laying only .. 43
,, plough .. .. 47
,, pipes of cement .. 46
,, tiles .. .. .. 97
,, timbering open .. 46
,, trench, cost of .. 47
,, pipes and traps 44, 46, 304
Draught rubber tubing .. 180
Dredging, per ton, various .. 41
Dressing and setting stone .. 61
Drilling holes in stone 51, 60
,, under water .. 55
Dynamite and gunpowder 48, 49

Earths and rocks, weight of 28
Earth scoops .. 28, 39
,, closets .. .. 174
Earthenware pipes, &c. .. 43
,, dampcourse .. 97
Earthwork measurement 30, 33
,, unbearing .. 33
Economic trees of Q. .. 316
Egg and dart moulding 63, 158
Electric bells.. .. .. 215
,, cranes .. .. 218
Electrical .. .. 212 to 218
Electric conductive power of metals .. .. 216
,, dynamos .. .. 212
,, engines .. .. 218
,, fans .. .. 215
,, haulage gear .. 218
,, heating .. .. 214
,, locomotives .. 218
,, lighting & lamps 213, 214
,, lifts .. 217, 339
,, motors .. .. 213
,, Pelton water wheel.. 216
,, portable jib cranes.. 218
,, power required for drilling .. .. 255
,, shot firing .. .. 50
,, telephones, &c. .. 216

PAGE

Electric telegraphs, erecting 216
,, tubing .. .. 216
,, wiring .. .. 216
Employers' Liability Act .. 352
Embossing and gilding 225, 230
Enamelled glass .. .. 228
Enamel baths .. .. 175
,, paint .. .. 221
Enamelled tiles .. 102, 103
Encasing girder and columns 153
Encaustic tile paving .. 103
Enrichments, plaster .. 158
Entablature, cradelling to .. 138
Engineers and plumbers' tools 271
Engines, portable and stationary .. 251, 272
,, fuel and water for.. 252
,, various, oil & gas .. 272
,, traction engines .. 272
,, horse-power .. 251
Excavating machine, Priestman's grabs .. 42
,, gasholders and reservoirs .. 29
Excavator .. .. 28 to 39
Excavators' work per c. yd. 29, 30, 35
,, per sup. yd. .. 35
,, measurement of 33
Excavated increase of earth 32
Excavation, clearing for .. 47
,, drains 43, 44, 47
,, large open .. 36
,, by machine .. 40
,, ship canal .. 40
,, surface 35, 44
,, timbering for .. 46
,, water and gas pipe 166, 169, 172
Expanded steel .. 77, 79
,, lattice wood 112, 148, 305
Explosives .. .. 48 to 50
Facia boards .. .. 147
Factory chimneys .. 81, 94
Falling and trimming trees.. 116
Fair day's work, carpenter.. 128
,, ,, navvy .. 28
Fanlights and skylights 130, 150

PAGE

Fanlight lifters and openers 242
Fence, wire droppers and strainers .. .. 209, 211
Fencing, post and rail .. 117
,, batten or picket 140, 148
,, gal. cor. iron 140, 165
,, paling, sawn 122, 140
,, labour and nails .. 117
,, palisading, iron .. 183
,, rolled steel .. 211
,, spacing post p. mile 209
,, weatherboard .. 140
,, wire fencing 209, 210
,, woven wire 208, 209
Ferro concrete .. .. 77
Ferol paint liquid .. .. 226
Fibro cement slates, &c. .. 106
Fibrous plaster .. 5, 123
Finials, cast iron .. .. 156
Fire extinguishers .. 227, 237
,, blocks .. .. 97
Fire-clay and fire-bricks 96, 97
,, sinks and urinals 174, 175
Fire resisting.. .. .. 237
Firelumps .. .. 74, 230
Fittings, gas and water .. 172
Fixed sashes for shops .. 129
Flagging .. 25, 53, 54
Flap traps .. .. .. 43
Flagging, bluestone.. 53, 64
,, slate .. .. 65
,, trachyte .. .. 66
Flexible metallic tubing .. 179
,, steel wire rope .. 260
Florite, opal wall tiles .. 104
Flooring, patent Aegypto .. 104
,, and lining 111, 140, 144
,, tiles 102, 103, 104
,, cement .. .. 79
,, weight of .. .. 26
Floors and roofs .. .. 115
Flutes, diminished stone .. 60
Fluting columns .. .. 60
Footings, stone 53, 57, 61, 64, 66, 67
Forest timbers, N.S.W. 285–291
Fractions and decimals table 42
Framed panelling .. .. 134
Foundation trenches .. 29

PAGE

Framing wood .. .. 119
Frames, door and window 129, 130
,, venetian .. .. 131
,, deal cased .. .. 130
,, French casement.. 131
Freestone .. 25, 54, 284
Frieze, iron .. .. .. 183
,, and cradling .. .. 138
French casements, &c. .. 129
Fretwork to masonry .. 59
,, in wood .. .. 306
Furnace doors and grates .. 183
Furniture, sash and door 242, 245

Galvanised iron .. 162, 191
,, pipes and gutters 163, 165
,, iron tubs .. 175
,, iron fencing .. 165
,, iron roofs 108, 165
,, wall ties.. .. 97
Galvanizing, cost of 183, 193
Gantry and travelling crane 123, 333
Gas fittings, &c. .. .. 172
,, steam and water fittings 170, 179
,, fitters' work .. .. 172
,, and oil engines .. .. 272
,, stoves .. .. 172, 238
Gates, railway, &c. .. .. 117
,, and coach-house doors 134
,, automatic closing .. 210
,, collapsible and patent 193, 210
,, tubular and wire .. 210
,, iron and rolled steel 192, 194, 211
Gauged arches, brick .. 95
Gauze fly blinds .. .. 246
Geelong free limestone .. 53
Gelatine dynamite .. .. 49
Getters and fillers, &c. .. 33
Geometrical stairs, wood .. 135
,, ,, iron .. 183
Gilding and bronze-moulding 224
Girders, wood .. .. 120
,, iron C. and W. 183, 192, 196

PAGE

Girders, bridges & compound 195
,, concreting .. .. 74
,, encasing concrete .. 153
Glaziers' work and glass 228, 231
,, cathedral and fancy.. 230
Glass, cutting and polishing 229
,, removing from sashes 230
,, roofing tiles .. .. 106
,, bevelling plate and silvering .. .. 229
Glazed earthenware damp-course .. .. .. 87
Glazing bars.. .. 229, 231
Gothic joinery .. 137, 141
,, lead lights .. .. 230
Graining and varnishing .. 224
Granite .. 25, 54, 59, 66
,, columns .. .. 62
,, rubble, weight of .. 83
,, where found in N.S. Wales .. .. 282
,, ditto. Queensland 310
Grab dredging .. .. 41
Gratings, cast iron .. 44, 183
,, wrought iron .. 193
Gravel or sand, weight of 82, 83
,, Nepean River .. 41
Grindstones .. .. 53
Grounds, framed, &c. 131, 140
Guard bars, W.I. .. .. 192
Gum boots .. .. .. 180
,, trees, various, 288, 301, 302, 322
Gun and Muntz metal 178, 206
Gunpowder .. .. 48, 50
Guttering and down-pipes .. 164
,, rocks, &c. .. .. 36
Gutters and bearers, wood.. 121
Gypsum for plaster .. .. 283

Hair, cows, for plastering .. 154
Handrails, balusters, &c. 136, 147
Hand broken road metal .. 82
,, made joinery table .. 132
,, power concrete machine 73
Handy Ready Reckoner .. 260
Hanging doors, large entrance 134
,, sliding time .. 128
Hardwood, strength of 27, 279

PAGE

Hearths, tiled .. .. 103
,, cement .. .. 159
Heating appliances .. .. 238
Herring bone strutting 115, 128
Hinges, springs, &c. 242, 243, 297
Hoardings for buildings .. 326
Hobart free sandstone 53, 59
Hoop iron for bonding .. 92
Horse gears .. .. .. 272
Horse-power of an engine 251, 252
Hose, Ind. rubber .. .. 180
,, leather .. .. 262
,, steam .. 179, 180
Hot-water fitter 177 to 179
,, heaters .. 179, 238
Hydraulic rams .. .. 266
,, lifts .. .. 217
,, lime and limestone 97, 283, 299

Incandescent lamps & lights 214, 237
India-rubber, various .. 180
Inspection drain boxes .. 44
Interlaced iron meshwork .. 193
Interest, amount of.. .. 24
Iron cast balcony rails .. 183
,, colums, gal. .. .. 197
,, cast balusters and newels .. .. 183
,, spouting, weight of .. 26
,, gates, cost hanging .. 194
,, cast, shrinkage of .. 183
,, girders, testing .. 181
,, grilles, panels .. .. 193
,, ribbon work .. .. 193
,, cramps for stonework.. 57
,, cast, pipes, brackets, &c. 183, 184
,, for roofs and floors 120, 192
,, wrought, galvanizing.. 193
,, ,, plate tanks 187, 192
,, gal. and corr. .. 162, 165
,, rivets, weight of .. 191
,, wrought, angle and tee 189
,, and steel, tests for .. 181
,, girder bridges .. .. 192
,, columns and pilasters.. 183
,, spiral stairs .. .. 183

PAGE

Iron cylinders, sinking .. 198
,, square and round .. 182
,, gates .. 192, 193, 194, 211
,, rolled joists, table .. 188
,, weight of .. .. 26
,, wrought, various 26, 192, 194
,, ,, tables of 187, 189, 190, 196, 200
,, ,, girders .. 195, 196
Ironite paving, patent .. 159
Ironbark, price of girders .. 110
,, strength of .. 279
,, districts where found 287, 302, 303
Ironmongery, builders 240 to 246
Ironwork, cast .. 26, 183
,, wrought .. 26, 192

Jacks, lifting, various .. 273
,, timber and screw .. 273
Jamb linings .. 128, 140
Jarrah hardwood ..24, 111, 295
Joiner .. 128 to 151
Jointing and laying water-pipes .. 184, 195
,, cement iron 194, 206
Joinery at Melbourne .. 294
,, Sydney .. .. 149
,, Brisbane .. .. 308
,, measurements 114, 128
,, labor for .. .. 115
Joists and flooring .. 115, 119
,, rolled .. 188, 192, 194
Jumping or drilling holes 51, 61

Kahn bar re-inforcement .. 78
Kalsomine colours, &c. 222, 225
Kerbs and gutters, various, cost .. .. .. 161
Kerosene incandescent lamps 237
,, oil engines .. 272
Kielberg drain pipes .. 46
Kitson incandescent lamps.. 236

Ladders, various .. .. 273
Laundry tubs .. .. 175
Lamps, .. .. .. 236
Laminated trusses .. .. 120
Landings, (slate), 54, 64, 65, 66

PAGE

Lath and plaster .. .. 154
Laths and lathings 26, 109, 110
,, and palings, weight of 26, 154
Lattice woodwork 112, 148, 305
,, iron mesh-work .. 193
,, wire .. .. 207
Lathing, patent .. .. 54
Lavatory apparatus .. 173
,, fancy brackets .. 173
Laying out angles .. .. 143
,, pipes, water and gas 116
Lead pipes and laying 166, 167
,, weight and price of 26, 166, 167, 176
,, labour laying .. .. 168
,, P. & S. traps 168, 176
,, light glazing .. .. 230
,, required to caulk pipes 176
Leather belting .. 263, 264
Legal Notes .. .. .. 344
Levelling made earth .. 35
Levels, masons and dumpy.. 273
Lifting a stone building .. 357
Lifts, electric and hydraulic 217, 329, 337
,, water lifts .. 265, 267
Lighting, heating 214, 236, 237
Lightning conductors .. 206
Limestone, quarrying .. 48
,, N.S. Wales 54, 283
,, Geelong.. 53, 299
,, Tasmania 53, 321
,, Oamaru, N.Z. 60, 323
,, Adelaide .. 319
Lime, Melbourne & Sydney 97
,, Victoria .. .. 299
,, and cement, weight of 26
,, hydraulic .. 97, 299
Limewhiting and white-washing 157, 222, 227
Lining and flooring 111, 140, 144
Linings, jamb .. 128, 140
Locks .. .. 244, 297
Loosening ground with plough .. .. 28, 15
Lotus leaf, stone, &c. .. 62
Lumber, terra cotta .. 102
Lux Light .. .. .. 237

| | PAGE |
|---|---|
| Magnetic exploder .. | .. 50 |
| Malthoid, waterproof | .. 87 |
| Manhole cover for drains | .. 46 |
| Mantelpieces .. | 65, 70 |
| Maple, Queensland .. | .. 309 |
| Marble, labour on .. | 69, 70 |
| ,, slabs, &c. | 66, 68, 69 |
| ,, mason .. | 68 to 70 |
| ,, weight of .. | 25, 68 |
| ,, tiles, black and white | 68, 70 |
| ,, cutting and working | 55, 69-70 |
| ,, lettering .. | .. 70 |
| ,, sawing and sanding.. | 70 |
| ,, skirtings .. | .. 70 |
| ,, where found .. | .. 283 |
| ,, S. Australian | 54, 59 |
| Marine glue .. | .. 85 |
| Marseilles, roofing tiles | .. 106 |
| Masonry, .. .. | 53 to 68 |
| ,, estimating measments .. | 56, 67 |
| ,, culverts and tunnels | .. 58 |
| ,, labour on.. | .. 59 |
| ,, machine dressed.. | 57 |
| ,, mouldings in | .. 59 |
| Matting, rubber stair | .. 180 |
| Measurements .. | see Trades |
| Measures and their sq. dim. | 358 |
| Melbourne building materials | 292 to 297 |
| Melting points of metals | .. 199 |
| Meshwork, interlaced iron | .. 193 |
| Metal encased mouldings | .. 204 |
| ,, broken road.. | .. 82 |
| ,, Worker .. | 199, 206 |
| Metals, weight from pattern | 199 |
| ,, weight of | 26, 27, 200 |
| Metallic flexible tubing | .. 179 |
| ,, lathing .. | .. 153 |
| ,, letters raised | .. 235 |
| ,, shop front .. | .. 204 |
| Meters, water .. | 169, 172 |
| Mill joinery .. .. | .. 148 |
| Mining shafts and tunnels | 36, 37 |
| Modelling and casting | .. 158 |
| Modillions, stone, &c. | .. 62 |
| Monier concrete | 75, 77, 80 |
| ,, pipes .. | .. 45 |
| Mortar and masonry | .. 58 |
| Mosaic floors, hearths, &c.. | 102 |
| Mouldings, wood .. | 140, 146 |
| ,, plaster .. | .. 153 |
| ,, metal encased | .. 204 |
| ,, stone .. | .. 59 |
| Mount Somers sandstone | 59, 60 |
| Muntz metal .. | 205, 206 |
| Moulding & polish. marble.. | 69 |
| Nails, spikes price list | .. 240 |
| Natural angle of rest | .. 27 |
| Netting wire .. | .. 207 |
| Nickel work .. .. | .. 205 |
| Oak, silky .. .. | .. 110 |
| Opal, glass sheets .. | .. 229 |
| Opalite tiles, wall .. | .. 104 |
| Opening a quarry .. | .. 52 |
| Oamaru free limestone | 59, 60, 62, 66, 323 |
| Oregon laths .. | .. 154 |
| ,, spars .. | .. 109 |
| ,, weight capacity | .. 27 |
| Oven tiles each .. | .. 97 |
| Ovens and stoves .. | 238, 297 |
| Over bridges cement | .. 80 |
| ,, doors, mantles, plaster | 161 |
| Paint, patent .. | 225, 226 |
| ,, oils, colours .. | 220, 297 |
| ,, lines or shadows | .. 224 |
| ,, material required for | 220 |
| Pacific pine .. .. | .. 110 |
| Painters' Work .. | 219 to 227 |
| ,, materials .. | .. 221 |
| ,, colouring .. | 222, 225 |
| Painting with hot tar | 86, 89 |
| Paling roof (half) .. | .. 107 |
| ,, fence .. .. | 122, 140 |
| Palings, hardwood .. | 122, 306 |
| ,, ,, weight of.. | 26 |
| Palisade, wall, iron & stone | 67 |
| Palisading, iron railing | .. 183 |
| Panel ceiling plaster | .. 160 |
| ,, ceiling steel .. | .. 204 |
| Panelling .. | 130, 133, 134 |

| | PAGE |
|---|---|
| Papier Mache, embossed | 235 |
| Papers, water-proof and | 86, 87 |
| ,, pulps, wall | 233, 234, 235 |
| Paperhangers' work | 232 to 235 |
| Papering, table to measure | 232 |
| Parquetry flooring | 113 |
| Parapet stone | 53 |
| Partitions wood | 119, 133 |
| Partition, fibrous plaster | 161 |
| ,, steel lath | 153 |
| Pastes for wood, metal | 234 |
| Patera or rosettes | 64 |
| Pavement blocks | 85 |
| ,, tarred, &c. | 86 |
| ,, and floor lights | 230 |
| Pavings, Arkilite | 85, 159 |
| ,, bluestone | 86 |
| ,, brick | 95 |
| ,, cement concrete | 86 |
| ,, Ironite and patent | 159 |
| ,, silicate | 86 |
| ,, water-channels | 95 |
| ,, and flagging | 53, 54, 64, 65, 66, 67, 85 |
| ,, tiles, Aust. | 26, 91, 104 |
| Pedestal closets | 173, 174 |
| Pelton Water-wheels | 216 |
| Perforated drain pipes | 44, 97 |
| ,, zinc | 202 |
| Pews and pulpits | 141 |
| Picket fencing hardwood | 122, 148, 306 |
| Pile armour | 80 |
| Piles, concrete | 80 |
| ,, metal sheathing | 206 |
| ,, hardwood | 109, 118, 119 |
| Pile shoes, iron | 193 |
| Pilaster capitals | 62, 137, 158 |
| Pipes and tanks to measure | 24 |
| ,, and gutters | 164, 165 |
| ,, wrought iron | 170, 177, 195 |
| ,, cast iron | 163, 184, 185 |
| ,, earthenware | 43, 97 |
| ,, lead and laying | 167, 168 |
| ,, copper, weight of | 177 |
| ,, iron, jointing | 184 |
| ,, cast iron flange | 185 |
| ,, water and gas | 166, 169 |
| Plant and tools | 269-274 |

| | PAGE |
|---|---|
| Planing wood, old and new | 122 |
| Plaster, fibrous | 160 |
| ,, grounds, fixing | 128, 131 |
| ,, materials | 154, 156 |
| ,, of Paris, weight of | 26, 156 |
| ,, brackets impost, &c. | 158 |
| ,, floors, cement | 75, 153 |
| ,, measurement | 152 |
| Plasterer | 152 to 161 |
| ,, scrim | 160, 297 |
| ,, work | 71, 153, 156 |
| Plate glass, various | 228, 229 |
| Plates, Monier concrete | 80 |
| Ploughing, for excavation | 28, 35 |
| Plough and scoop | 28, 39 |
| Plumbers & Engineers' tools | 271 |
| ,, work | 162 to 180 |
| ,, surface pipes | 166, 169 |
| ,, laying lead | 168 |
| Pointing, flat joint and tuck | 95 |
| Polishing glass | 229 |
| ,, granite, &c. | 66 |
| ,, marble, &c. | 69 |
| ,, French | 222, 223 |
| Poppet head or derrick, cost | 253 |
| Portable railways | 38 |
| Porphyry labour dressing | 59 |
| Post and beams to superficial | 100 |
| ,, fencing, per mile | 209 |
| Production of tints | 219 |
| Portland cement | 24, 71, 152 |
| Posts and rails | 25, 109, 117 |
| Prices, Ready Reckoner of | 360 |
| Prismoidal formula | 33 |
| Prismatic lights | 229, 230, 231 |
| Puddle clay, substitute for | 83 |
| Pulsometer steam pump | 268 |
| Pumps, various | 174, 265 |
| ,, ironwork for | 192 |
| ,, leather cups | 262 |
| Quantities and measurements | 17 |
| Quarrying freestone | 51, 55 |
| ,, bluestone, &c. | 53 |
| ,, confined space | 37 |
| ,, submarine | 55 |
| Quartz, white metal | 82 |
| Queensland building materials | 212, 384, 309 |

PAGE
Radiators, Heating. .. 238
Railways, portable . .. 38
Railway Truck capacity .. 27
„ cuttings and excavation .. 33, 34
„ sleepers .. .. 116
„ buffer frames, gates .. .. 117
„ tunnelling .. 37
Railings, wrought iron .. 193
Rakes and Ramps .. .. 96
Ram, hydraulic .. .. 266
Ready Reckoner Table .. 360
Removing rust from iron.. 357
„ old metal roads 89
Re-inforced concrete .. 77
Reservoirs, excavating for 29, 32
Reveals and openings 155, 156
Revolving shutters.. .. 137
Ridge and hip rolls .. 128
Ridge capping, gal. iron .. 164
Road grading machine .. 40
„ excavation for pipes 169
„ making .. 82, 88
Roads and floors, asphalt.. 85
„ „ concrete.. 75
Road metal, weight of .. 83
„ various .. .. 82
Rock blasting, &c. .. 51
„ drills, machine .. 258
„ faced sheeting .. 205
Rolled iron joists, per lb. 192, 194, 188
Roofing materials, weight of 26
„ ironwork, cor. gal. 165
„ carpentry .. 115, 120
„ constants .. .. 120
„ estimated .. .. 108
„ principals .. .. 120
„ patent material .. 87
Rope, hemp, steell wire 260, 261
„ pulley blocks . .. 261
Ropes and chains comparison, &c. .. 259-261
Rough boarding .. .. 140
R und-top border sandstone 57
Rubble stone .. .. 53
„ masonry .. .. 57

PAGE
Rubber goods .. .. 180

Sand for mortar, &c. 97, 154
„ Nepean River 82, 154
Sandstone, Sydney.. 53, 59
„ Victoria 53, 300
„ Tasmania 53, 59
„ N.S. Wales 53, 284
„ Queensland 61,58,304
„ machine dressed 57
„ Omaru .. .. 53
„ weight of 25, 35
Sanitary apparatus 173, 304
Sashes and frames 130, 151-193
„ steel . .. .. 193
Sash balance .. .. 242
„ cord plates .. .. 242
„ bars for shop fronts 129
„ furniture .. 241, 242
Sawing and splitting .. 117
„ and polishing stone 66
Scabbling trenches.. .. 32
Scaffold poles .. .. 295
Scaffolding and Lifts Act 329
Scantlings to superficial 125, 126
Scappled stone at quarries 53
„ in Melbourne 53, 54
„ in Launceston 54
„ in Hobart 53, 54
School furniture, cedar .. 142
Scrim plasterers .. 160, 297
Scrub cutting .. .. 47
Setting freestone, bluestone 61
„ stoves, ovens, &c. 94, 96
„ copper boilers .. 96
„ extra large stones.. 61
Sewer, brickwork to .. 94
„ cast iron oval .. 183
„ drain pipe .. 45-46
Seyssel asphalte .. .. 84
Shaft or well sinking .. 37
Shafts, cost of brickwork 98, 99
Shelving, American 111, 140
„ slate .. .. 65
„ cedar, &c. .. 113
Sheets, Fibro cement .. 106
Shingling metal .. .. 107
Shingle, river, weight of .. 27

PAGE

Shingles and shingling .. 107
Shop front, sashes, &c. .. 129
„ fronts, metal 204, 205
Shoveller's work .. 28, 33
Shrinkage of castings .. 199
Shutters, various .. .. 137
Silicate paving .. .. 86
Sills, door and window stone 57
„ window, wood .. 147
Sinks, iron .. .. .. 175
Skirting plaster .. .. 156
„ wood .. 139, 140
Skylights and fanlights 130, 163-229
Slate, mason .. 65-70
„ N.S.W. .. 70, 284
„ Castlemaine .. 65, 300
„ S. Australian.. 54, 65
„ and battens .. .. 105
„ landings, wine bins, &c. .. .. 65, 67
„ baths and tanks .. 65
Slater, Tiler, Shingler 105-108
„ cartage of .. .. 97
„ Fibro cement .. 106
„ number to square .. 105
„ weight of .. 68, 105
„ verandah nosings .. 70
Sleepers, railway cost of, &c. 116
Smith's work .. 180 to 198
Snagging rivers .. .. 55
Soffits of beams, girders.. 161
„ window .. .. 130
Soil pipes, cast iron .. 163
„ „ lead .. 167, 168
Spacing battens, roofing 105, 112
„ fencing posts, per mile .. .. 209
„ tables .. 112, 113
Spalls, cost of stone .. 83
Splitting and fencing 117, 140
Spouting, cast .. .. 291
Spouting, gal. iron 164, 165
Spotted gum .. 288, 303, 318
„ „ strength of 280, 281
Spraying machines .. 225
Spreading and levelling soil 35
Spring shade rollers .. 246
Sprinklers, Fire Patent .. 239

PAGE

Spun metal balusters .. 205
Squaring timber .. .. 116
Stair treads, brass or rubber .. .. 180, 205
Staircases, concreting 74, 78
„ wood .. .. 135
„ iron .. 183, 197
Stawell, Vic. sandstone 53, 300
Steam and water fittings 171-179
„ shovel .. .. 40
Steel water pipes .. 170, 195
„ rod and bar per foot 189
„ ceilings .. .. 204
„ wire ropes .. .. 260
„ lathing .. .. 153
„ rolled joists.. 188, 194
„ sashes and frames .. 193
„ rolled gates and fences 211
Stench traps and gratings 44
Steps and sills .. 57, 64
„ and risers, iron .. 183
„ cement .. .. 159
„ heavy hardwood .. 122
„ marble .. .. 70
„ slate .. 65, 67, 70
„ trachyte .. 66, 67
Stone coping .. .. 57
„ cutting .. 59, 60
„ carving freestone 62, 63
„ weight of building.. 25
„ breaking machine .. 83
„ lettering .. .. 70
„ at quarries .. .. 53
„ setting .. .. 61
Stoves and ovens .. 238, 297
Stove bricks .. .. 97
„ setting .. 94, 96
Street paving .. 88, 89
Strength of building materials .. .. 23
„ of timbers .. 279
Stringy bark, strength of 279
„ bark .. 288, 303, 318
String boards .. .. 136
Stripping old roofs .. 105
Studs spacing table .. 105
„ to superficial table.. 125
Stucco, lime and cement .. 155

PAGE

Submarine work .. .. 55
Surface water drains .. 47
„ forming, earth, &c. 35
Suspended floors, concrete 79
Sydney sandstone and grindstone .. .. 53
Sylvester's wall wash .. 291
Syphons, earthenware .. 44
„ lead, trap, &c. 168, 176

T. & G. partitions.. .. 133
Table for excavator .. 30
„ for spacing 112, 113
Tallow wood .. .. 288
Tanks, contents of earth 24, 28
„ wells, shafts . .. 36
„ excavation for 28, 29, 36
„ slate . .. .. 65
„ wrought iron .. 187
„ gal. corrugated iron 296
„ brick in cement 94, 99
Tar and concrete paving.. 86
Tarred metal roads 88, 89
Tarlee stone .. .. 54
Telephones .. .. .. 216
Telegraph, electric .. 210
Terra cotta air bricks .. 97
„ chimney pots 102, 304
„ roofing and tiles 106, 107
„ wall and floor tiles.. 102, 103
„ window sills .. 102
„ partion bricks.. 102
„ lumber, &c. .. 102
Tests of cement .. .. 24
„ of timber 279, 290, 314, 315
Testing iron or girders .. 181
„ soundness of a log 358
Tiles, oven .. .. .. 97
„ encaustic .. .. 103
„ briquettes .. .. 102
„ Faience work .. 103
„ wall .. .. 103, 104
„ marble .. .. 70
„ opalite wall.. .. 104
„ number to sq. yard 91, 104

PAGE

Tiles, laying roof .. .. 70
„ laying wall .. .. 104
„ baker's oven .. 97
Timber merchants list 144, 151
„ tables .. 124, 127
„ at Melbourne 109, 292 to 303
„ Sydney .. 109, 144
„ trees of N.S.W. 285, 291
„ „ Queensland 311
„ „ Tasmania 322
„ „ New Zeal. 324
„ bridges, piling, &c. 109, 118
„ strength of .. 24
Timbering for concrete 75,76,79
„ for excavation drains .. 46
Tints in painting .. 219, 220
Tinting and bronzing papers 234
Tip cart capacity .. .. 28
Trachyte, N. Zealand .. 323
„ .. .. 66, 89
„ dressed and rough 66
„ labour on.. .. 59
Traps and syphons.. 44, 179
Trees, falling and squaring 116
Trenches for foundations 28, 29
Trellis work . .. 113, 148
Tripod, towers for crane.. 123
Trucks and wagons .. 39
Trusses, roof .. .. 120
„ plaster .. .. 157
Trygliphs in stone .. 60
Tubes, steam and water table .. 170, 171
„ for artesian bores 254
Tubing, draught rubber .. 180
„ zinc .. .. 216
Tuck pointing .. 93, 95
Tunnels and drives .. 37
Turfing or laying sods .. 35
Turner's work, wood 142, 148, 294, 306
Turpentine piles 109, 289, 290
Twencent incand. burners 237

Undercutter, for excavation 55
Under pinning walls 58, 96, 357

PAGE
Urinals, &c. .. 65, 174
Useful cements for iron 194, 206
„ tables and mem. .. 357

Varnishing and polishing 222, 223
Venetian frames .. 130
„ blinds .. 145, 246
„ shutters or louvres 131, 145, 151
Ventilators, gal. iron 176, 183
„ roof .. .. 141
„ .. 130, 203, 297
„ mica flap .. 165
„ wood, church.. 141
Vent pipes, gal. iron .. 165
„ plaster wall .. .. 160
Verandah floors 80, 76, 91, 103
„ posts .. .. 148
„ angle sweeps Brisb. 305
„ complete, per foot 194
„ ironwork, &c. 183, 197
Vermiculated work to masonry .. .. 59
Victoria building materials 292, 303
Victorite, pat. plaster .. 161
Vulcanised Ind. rub. tubing 180

Washes, coloured wall 225, 227
Washers, weight of 100 iron 187
Washing coppers .. 177, 238
Walls and ceilings plaster 155
Water pipes, iron and steel 184, 185
„ and steam fittings.. 170
„ and gas tubes and fittings 169, 170, 171
„ pipes excavation 172, 185
„ lifts . .. .. 267
„ pipes, asphalte .. 47
„ mains, jointing 176, 185, 195
Waterclosets .. .. 135
Waterproof courses .. 86
„ felts, papers 86, 87
„ wall wash .. 291
Weatherboarding, p. sq. 111, 122, 145

PAGE
Wells, cost of sinking, &c. 36
„ brickwork for .. 98
Weights and measures .. 359
Weight of roofs, floors .. 26
„ of building materials.. 23, 27
„ of glass per s. ft.. 229
„ of building mats. 25
Wharves ironwork .. 192
Wheelbarrow load earthwork 35
White ant exterminators 226, 234
White stone metal .. 82
„ wash recipes .. 227
Windmills and Pumps 266, 267
Window furniture 241, 242
„ boxings .. .. 130
„ blinds .. 145, 246
„ joinery .. 130, 147
Wire fencing .. 208, 209
„ ropes, weight of, cost 260, 261
Wire Worker .. 207-211
„ fencing, weight of.. 191
„ gauze sheet .. .. 208
„ lattice .. .. 207
„ netting, gal. iron .. 207
„ woven gates, fences.. 210
Wood-paving, Sydney 89, 324, 325
„ carving .. 131, 138
Woven wire .. 207-211
Writing on glass .. .. 225
Wrought iron, labour .. 192
„ „ pipes 170, 177, 195
„ „ girders 195, 196

Yale latches and padlocks 243, 244

Zinc and zinc work 26, 202, 203
„ glazing bars.. .. 203
„ finials and statues 203, 205
„ letters for signs .. 203
„ sheet and perforated 202
„ powder for paints .. 221
„ roofing tiles .. 107, 203
„ tubing. .. .. 216

J. H. SODERBERG
BUILDER AND
CONTRACTOR
GRAY ST., HAMILTON

J. H. SODERBERG
BUILDER AND CONTRACTOR
GRAY ST, HAMILTON

# THE AUSTRALIAN

# Builders and Contractors' Price Book.

## QUANTITIES & MEASUREMENTS.

In addition to the rules for measurements given under the various trades, the following mems. will be found useful :—

Adhere as much as possible to one system and routine of measurement, following the order pursued by the builder, &c., in actual construction.

In taking dimensions, it will be found most convenient to work from left to right, especially when making sketch plans with dimensions.

**In excavations,** foundations, or walls of a building : take the back and front and parallel walls from out to out, and the other walls in the clear.

In scaling from a plan, when the dimensions are not given, apply the reading of the scale at the end of the first dimension to the commencement of the second dimension ; repeating the operation until the scale is exhausted or the end of the scale is reached ; note these accumulated dimensions, and repeat the process until the whole of the walls required are measured.

The measurement of the length of foundation walls will be a check on the measurement of the walls forming the superstructure. These lengths can be taken for the trenches in excavation, allowing about 12 inches in the widths to enable the masons, &c., to strike the joints. As the excavation, levelling and stopping of trenches, with part refilled and rammed, are worth double or treble ordinary excavation, they must be kept separate.

Rock excavation should be reckoned by the cube yard with the stepping and levelling by the foot super.

**Chimney breasts,** including fireplaces, are generally reckoned solid, allow for arch separately, when the fireplace opening is deducted.

**Cornices, strings, &c.,** are reckoned solid, the length, breadth and depth being taken.

**Ovens, coppers, and furnaces** are reckoned solid by the cube yard.

**Facings, pointing, &c.,** by the yard super or square of 100 sup. feet.

**Gauged arches, cuttings, &c.,** by the foot super.

**Openings.**—The width is always given first and then the height ; *daylight* or the size of opening in wall being intended. If the head is curved, the height from the stone or brick sill to the centre of soffit is implied, unless stated otherwise.

**Flooring** may include joists at per square, or the joists may be taken at per hundred lineal feet, stating the scantling ; or per 100 sup. feet, one inch thick. If the flooring is taken net, it will form with the hearths and chimney breasts a check for the plastering or lining of ceilings, after deducting well-holes of stairs, &c. If the net measurement is taken for flooring, an addition must be made to the price to allow for loss of width by tongueing and grooving, besides short lengths and remnants too short to work in. This, with 6 x 1 T. and G. flooring, would be about ten per cent.

**Chimney breasts or flues** are not deducted in measuring ceilings.

**The lineal measurement of facia** next eaves will also give the length of eaves for slating, and the length of eaves spouting, with one foot added for each angle. The soffit, if more than 11ins. wide, should be reckoned by the foot super.

**Bracketing** per super foot.—Take lengths of walls by the girth of brackets.

Ribbed and other centring, per foot super.

**Joinery** is reckoned by the foot super, or lineal foot, as given under the various headings.

## COST OF BUILDINGS BY CUBING.

This may be approximately arrived at by the method of cubing, although reliance must *only* be placed upon the tedious, but exact, method of taking out quantities and pricing in detail every item specified.

Balconies, Verandahs and Out-offices and Projections taken, measured, and classed by themselves. Judgment and experience is indispensable.

[ *To be used only as a check in case of faulty tendering.*]

The cubed prices worked out from accepted tenders in Sydney and N.S.W., from 1903 to 1907 are about :—

| | | | |
|---|---|---|---|
| Mansions, two storey, first class finish | from | -/8 | to -/10 |
| Public Office buildings, stone | | -/9 | ,, 1/3 |
| Gaol, plain brick or concrete | | -/6½ | ,, -/7½ |
| Fire Stations and Residences, suburban | | -/5 | ,, -/5½ |
| First-class city Shops | | | -/8 |
| Church, brick and slate roof (country—Inverell) | | | -/6 |
| Public Schools, suburban | | -/5 | ,, -/6 |
| Villa Residences, 2nd Class | | -/6 | ,, -/8 |
| Villas, slate roof | | -/5½ | ,, -/6 |
| Modern Cottages, tiled roof, and 3rd Class | | -/4½ | ,, -/5 |
| Plain Spacious Stores, city | | -/4 | ,, -/6 |
| Weatherboard Cottages | | -/4 | ,, -/5 |
| Brick Out-offices of Residences | | -/3½ | ,, -/6½ |

## TABLE OF THE CIRCUMFERENCES AND AREAS OF CIRCLES.

*for either inches, feet, yards, links or chains*

| Dia. | Circum. | Area. | Dia. | Circum. | Area. | Dia. | Circum. | Area. |
|---|---|---|---|---|---|---|---|---|
| | | | 9 | 28.27 | 63.62 | 18 | 56 55 | 254.41 |
| ¼ | 0.785 | .049 | ¼ | 29.06 | 67.20 | ¼ | 57.33 | 261.51 |
| ½ | 1.571 | .196 | ½ | 29.84 | 70.88 | ½ | 58.12 | 268 80 |
| ¾ | 2.356 | .442 | ¾ | 30 63 | 74.66 | ¾ | 58 91 | 276.12 |
| 1 | 3.142 | 785 | 10 | 31.42 | 78.54 | 19 | 59 69 | 283.53 |
| ¼ | 3.927 | 1 227 | ¼ | 32.20 | 82.52 | ¼ | 60 47 | 291.04 |
| ½ | 4.712 | 1.767 | ½ | 32.99 | 86.59 | ½ | 61.26 | 298.65 |
| ¾ | 5.498 | 2.405 | ¾ | 33.77 | 90.76 | ¾ | 62.05 | 306 35 |
| 2 | 6.283 | 3.142 | 11 | 34.56 | 95.03 | 20 | 62.83 | 314.16 |
| ¼ | 7.069 | 3.976 | ¼ | 35.34 | 99.40 | ¼ | 63.62 | 322.06 |
| ½ | 7.854 | 4.909 | ½ | 36.13 | 103.87 | ½ | 64.40 | 330.06 |
| ¾ | 8.639 | 5.939 | ¾ | 36.91 | 108.43 | ¾ | 65.19 | 338.16 |
| 3 | 9.425 | 7.068 | 12 | 37.70 | 113.10 | 21 | 65.79 | 346.36 |
| ¼ | 10.210 | 8.296 | ¼ | 38.48 | 117.86 | ¼ | 66.76 | 354.66 |
| ½ | 10.995 | 9.621 | ½ | 39.27 | 122.72 | ½ | 67.54 | 363.05 |
| ¾ | 11.781 | 11.044 | ¾ | 40.05 | 127.68 | ¾ | 68,33 | 371.54 |
| 4 | 12.566 | 12.566 | 13 | 40.84 | 132.73 | 22 | 69.11 | 380.13 |
| ¼ | 13.351 | 14.186 | ¼ | 41 63 | 137.89 | ¼ | 69.90 | 388.82 |
| ½ | 14.137 | 15.904 | ½ | 42.41 | 143.14 | ½ | 70.69 | 397.61 |
| ¾ | 14.922 | 17.720 | ¾ | 43.20 | 148.49 | ¾ | 71.47 | 406.49 |
| 5 | 15.71 | 19 63 | 14 | 43.98 | 153.94 | 23 | 72.26 | 415.48 |
| ¼ | 16.49 | 21.65 | ¼ | 44.77 | 159 48 | ¼ | 73.04 | 424.56 |
| ½ | 17 28 | 23.76 | ½ | 45.55 | 165.13 | ½ | 73.83 | 433.73 |
| ¾ | 18 06 | 25.97 | ¾ | 46.34 | 170.87 | ¾ | 74.61 | 443.01 |
| 6 | 18.85 | 28.27 | 15 | 47.12 | 176.71 | 24 | 75.40 | 452 39 |
| ¼ | 19.63 | 30.68 | ¼ | 47.91 | 182.65 | ¼ | 76.18 | 461.86 |
| ½ | 20.42 | 33.18 | ½ | 48.69 | 188.69 | ½ | 76.97 | 471.44 |
| ¾ | 21.20 | 35.78 | ¾ | 49.48 | 194.83 | ¾ | 77.75 | 481.11 |
| 7 | 21.99 | 38.48 | 16 | 50.26 | 201.06 | 25 | 78.54 | 490.87 |
| ¼ | 22.78 | 41.28 | ¼ | 51.05 | 207.39 | ¼ | 79.32 | 500.74 |
| ½ | 23.56 | 44.18 | ½ | 51.84 | 213.82 | ½ | 80.11 | 510.71 |
| ¾ | 24.35 | 47.17 | ¾ | 52.62 | 220.35 | ¾ | 80.90 | 520.77 |
| 8 | 25.13 | 50.26 | 17 | 53.41 | 226.98 | 26 | 81.68 | 530.93 |
| ¼ | 25.92 | 53.46 | ¼ | 54.19 | 233.70 | ¼ | 82.47 | 541.19 |
| ½ | 26.70 | 56.74 | ½ | 54.98 | 240.53 | ½ | 83.25 | 551.55 |
| ¾ | 27.49 | 60.13 | ¾ | 55.76 | 247.45 | ¾ | 84.04 | 562.00 |

TABLE (*Continued,*) SHOWING CIRCUMFERENCES AND AREAS OF CIRCLES, *for either inches, feet, yards, links, or chains.*

| Dia. | Circum. | Area | Dia. | Circum. | Area. | Dia. | Circum. | Area. |
|---|---|---|---|---|---|---|---|---|
| 27 | 84 82 | 572.56 | 36 | 113.10 | 1017.9 | 45 | 141.37 | 1590.4 |
| ¼ | 85.61 | 583.21 | ¼ | 113.88 | 1032.1 | ¼ | 142.16 | 1608.2 |
| ½ | 86.39 | 593.96 | ½ | 114 67 | 1046.4 | ½ | 142.94 | 1626 0 |
| ¾ | 87.18 | 604 81 | ¾ | 115.45 | 1060.7 | ¾ | 143.73 | 1643.9 |
| 28 | 87.96 | 615.75 | 37 | 116 24 | 1075.2 | 46 | 144.51 | 1661.9 |
| ¼ | 88.75 | 626 80 | ¼ | 117.02 | 1089.8 | ¼ | 145.03 | 1680.0 |
| ½ | 89 53 | 637.94 | ½ | 117 81 | 1104.5 | ½ | 146.08 | 1698.2 |
| ¾ | 90.32 | 649.18 | ¾ | 118.59 | 1119.2 | ¾ | 146.87 | 1716 5 |
| 29 | 91.11 | 660 52 | 38 | 119 38 | 1134.1 | 47 | 147.66 | 1734.9 |
| ¼ | 91.89 | 671.96 | ¼ | 120 17 | 1149.1 | ¼ | 148 44 | 1753 5 |
| ½ | 92.68 | 683.49 | ½ | 120.95 | 1164.1 | ½ | 149.23 | 1772.1 |
| ¾ | 93.46 | 695 13 | ¾ | 121.74 | 1179.3 | ¾ | 150.01 | 1790.8 |
| 30 | 94.25 | 706.86 | 39 | 122.52 | 1194.6 | 48 | 150.80 | 1809.6 |
| ¼ | 95.03 | 718 69 | ¼ | 123.31 | 1209.9 | ¼ | 151.58 | 1828.5 |
| ½ | 95.82 | 730.62 | ½ | 124 09 | 1225.4 | ½ | 152.37 | 1847.5 |
| ¾ | 96.60 | 742.64 | ¾ | 124.88 | 1241.0 | ¾ | 153.15 | 1868.6 |
| 31 | 97.39 | 754.77 | 40 | 125.66 | 1256 6 | 49 | 153 94 | 1885.7 |
| ¼ | 98.17 | 766.99 | ¼ | 126.45 | 1272.4 | ¼ | 154 72 | 1905.0 |
| ½ | 98 97 | 779 31 | ½ | 127.23 | 1288.2 | ½ | 155.51 | 1924.4 |
| ¾ | 99.75 | 791.73 | ¾ | 128.02 | 1304 2 | ¾ | 156.29 | 1943.9 |
| 32 | 100 53 | 804 25 | 41 | 128.81 | 1320.3 | 50 | 157.08 | 1963.5 |
| ¼ | 101.32 | 816.86 | ¼ | 129.59 | 1336 4 | ¼ | 157.87 | 1983.2 |
| ½ | 102 10 | 829.58 | ½ | 130.38 | 1352 6 | ½ | 158 65 | 2003 0 |
| ¾ | 102.89 | 842 39 | ¾ | 131.16 | 1369 0 | ¾ | 159 44 | 2022.8 |
| 33 | 103.67 | 855.30 | 42 | 131.95 | 1385.4 | 51 | 160.22 | 2042.8 |
| ¼ | 104.46 | 868.30 | ¼ | 132.73 | 1402 0 | ¼ | 161.01 | 2062 9 |
| ½ | 105.24 | 881.41 | ½ | 133.52 | 1418 6 | ½ | 161.79 | 2083 1 |
| ¾ | 106.03 | 894.61 | ¾ | 134 30 | 1435.4 | ¾ | 162.58 | 2103 4 |
| 34 | 106 81 | 907.92 | 43 | 135 09 | 1452.2 | 52 | 163.36 | 2123.7 |
| ¼ | 107.60 | 921.32 | ¼ | 135.87 | 1469.1 | ¼ | 164.15 | 2144.2 |
| ½ | 108.38 | 934.82 | ½ | 136.66 | 1486.2 | ½ | 164.93 | 2164.8 |
| ¾ | 109 17 | 948.41 | ¾ | 137 45 | 1503.3 | ¾ | 165.72 | 2185.4 |
| 35 | 109.96 | 962 11 | 44 | 138.23 | 1520.5 | 53 | 160.50 | 2206.2 |
| ¼ | 110.74 | 975.90 | ¼ | 139 02 | 1537 8 | ¼ | 167.29 | 2227.1 |
| ½ | 111.53 | 989.80 | ½ | 139.80 | 1555.3 | ½ | 168.08 | 2248.0 |
| ¾ | 112,31 | 1003.7 | ¾ | 140 59 | 1572.8 | ¾ | 168.86 | 2269 1 |

TABLE (*Continued*), SHOWING CIRCUMFERENCES AND AREAS OF CIRCLES, *for either inches, feet, yards, links, or chains.*

| Dia. | Circum. | Area | Dia. | Circum. | Area. | Dia. | Circum. | Area. |
|---|---|---|---|---|---|---|---|---|
| 54 | 169.65 | 2290.2 | 63 | 197.92 | 3117.3 | 72 | 226.20 | 4071.5 |
| ¼ | 170.43 | 2311.5 | ¼ | 198.71 | 3142.0 | ¼ | 226 98 | 4099.8 |
| ½ | 171.22 | 2332.8 | ½ | 199.49 | 3166.9 | ½ | 227.77 | 4128.3 |
| ¾ | 172 00 | 2354.3 | ¾ | 200.28 | 3191.9 | ¾ | 228.55 | 4156.8 |
| 55 | 172.70 | 2375.8 | 64 | 201.06 | 3217.0 | 73 | 229 34 | 4185 4 |
| ¼ | 173.57 | 2397.5 | ¼ | 201.85 | 3242.2 | ¼ | 230.12 | 4214.1 |
| ½ | 174.36 | 2419.2 | ½ | 202.63 | 3267.5 | ½ | 230.91 | 4242.9 |
| ¾ | 175.14 | 2441.1 | ¾ | 203.42 | 3292.8 | ¾ | 231.69 | 4271.8 |
| 56 | 175 93 | 2463.0 | 65 | 204.20 | 3318.3 | 74 | 232.48 | 4300.9 |
| ¼ | 176 72 | 2485.1 | ¼ | 204 99 | 3343.9 | ¼ | 233.26 | 4330.0 |
| ½ | 177.50 | 2507.2 | ½ | 205.77 | 3369 6 | ½ | 234.05 | 4359.2 |
| ¾ | 178.29 | 2529.4 | ¾ | 206 56 | 3395.3 | ¾ | 234.83 | 4388.5 |
| 57 | 179.07 | 2551.8 | 66 | 207.35 | 3421.2 | 75 | 235.62 | 4417.9 |
| ¼ | 179.86 | 2574.2 | ¼ | 208.13 | 3447 2 | ¼ | 236.41 | 4447.4 |
| ½ | 180.64 | 2596.7 | ½ | 208.92 | 3473.2 | ½ | 237.19 | 4477.0 |
| ¾ | 181.43 | 2619.4 | ¾ | 209.70 | 3499.4 | ¾ | 237.98 | 4506 7 |
| 58 | 182 21 | 2642 1 | 67 | 210.49 | 3525.7 | 76 | 238.76 | 4536.5 |
| ¼ | 183.00 | 2664.9 | ¼ | 211.27 | 3552.0 | ¼ | 239.55 | 4566.4 |
| ½ | 183 78 | 2687.8 | ½ | 212.06 | 3578.5 | ½ | 240.33 | 4596.4 |
| ¾ | 184.57 | 2710.9 | ¾ | 212 84 | 3605.0 | ¾ | 241.12 | 4626.4 |
| 59 | 185.35 | 2734.0 | 68 | 213.63 | 3631 7 | 77 | 241.90 | 4656.6 |
| ¼ | 186.14 | 2757.2 | ¼ | 214.41 | 3658.4 | ¼ | 242.69 | 4686.9 |
| ½ | 186.93 | 2780.5 | ½ | 215 20 | 3685 3 | ½ | 243 47 | 4717.3 |
| ¾ | 187.71 | 2803,9 | ¾ | 215.99 | 3712 2 | ¾ | 244.26 | 4747.8 |
| 60 | 188.50 | 2827.4 | 69 | 216.77 | 3739.3 | 78 | 245.04 | 4778.4 |
| ¼ | 189.28 | 2851.1 | ¼ | 217.56 | 3766.4 | ¼ | 245 83 | 4809.1 |
| ½ | 189.07 | 2874 8 | ½ | 218.34 | 3793.7 | ½ | 246 62 | 4839.8 |
| ¾ | 190.85 | 2898.6 | ¾ | 219.13 | 3821.0 | ¾ | 247.40 | 4870.7 |
| 61 | 191.64 | 2922.5 | 70 | 219.91 | 3848.5 | 79 | 248.19 | 4901.7 |
| ¼ | 192 42 | 2946.5 | ¼ | 220.70 | 3876 0 | ¼ | 248.97 | 4932.8 |
| ½ | 193.21 | 2970 6 | ½ | 221.48 | 3903.6 | ½ | 249.76 | 4963 9 |
| ¾ | 193.99 | 2994.8 | ¾ | 222.27 | 3931.4 | ¾ | 250.54 | 4995.2 |
| 62 | 194 78 | 3019.1 | 71 | 223.05 | 3959.2 | 80 | 251 33 | 5026.6 |
| ¼ | 195 56 | 3043.5 | ¼ | 223.84 | 3987.1 | ¼ | 252.11 | 5058.1 |
| ½ | 196.35 | 3068.0 | ½ | 224.62 | 4015 2 | ½ | 252.90 | 5089.6 |
| ¾ | 197.14 | 3092.6 | ¾ | 225.41 | 4043.3 | ¾ | 253.67 | 5121.2 |

TABLE (*Continued*), SHOWING CIRCUMFERENCES AND AREAS OF CIRCLES, *for either inches, feet, yards, links, or chains.*

| Dia. | Circum. | Area. | Dia. | Circum. | Area. | Dia. | Circum. | Area. |
|---|---|---|---|---|---|---|---|---|
| 81 | 254.47 | 5153.0 | 87 | 273.32 | 5944.7 | 93 | 292.17 | 6792.9 |
| ¼ | 256.04 | 5216 8 | ½ | 274.89 | 6013.2 | ½ | 293.74 | 6866.2 |
| 82 | 257.61 | 5281.0 | 88 | 276.46 | 6082.1 | 94 | 295.31 | 6939.8 |
| ½ | 259.18 | 5345.6 | ½ | 278.03 | 6151.4 | ½ | 296 88 | 7013.8 |
| 83 | 260.75 | 5410 6 | 89 | 279 60 | 6221.2 | 95 | 298.45 | 7088.2 |
| ½ | 262.32 | 5476.0 | ½ | 281.17 | 6291.3 | ½ | 300.02 | 7163 0 |
| 84 | 263.89 | 5541.8 | 90 | 282.74 | 6361.7 | 96 | 301.50 | 7238.2 |
| ½ | 265.47 | 5608.0 | ½ | 284.31 | 6432 6 | ½ | 303.16 | 7313.6 |
| 85 | 267 04 | 5674.5 | 91 | 285.89 | 6503 9 | 97 | 304.65 | 7389.8 |
| ½ | 268.61 | 5741.5 | ½ | 287.46 | 6573.6 | 98 | 307.84 | 7542.9 |
| 86 | 270.18 | 5808.8 | 92 | 289.03 | 6647.6 | 99 | 311.00 | 7697.7 |
| ½ | 271.75 | 5876.6 | ½ | 290.60 | 6720.1 | 100 | 314.16 | 7854.0 |

CIRCUMFERENCES —If the diam. is between 100 and 200, call the radius the diam. and double the given circumference. If between 200 and 300, enter the Table with one-third the diam., and multiply the given circumference by 3 If between 300 and 400, or 400 and 500, enter the Table with one-fourth or one-fifth, and multiply by 4 or 5, and so on for any number, taking care to multiply the given circumference by the same figure that you divided the diam. by.

EXAMPLE —Required the circumference of a circle whose diam, is 152 —Enter the Table with the radius 76, the circumference given is 238 76 and 238.76, x 2 = 477.52, the circumference required.

AREAS.— If the diam. is more than 100, enter the Table with one-half or one-third, &c., as above, and multiply the area given by (4, or 9 &c.,) the *square* of the figure you divided the diam. by.

EXAMPLE.—Required the area of the circle given in the last example. Opposite to 76 the area given is 4536.5 and 4536.5 x 4 [2 x 2]= 18146.0, the area required.

CAPACITY.—The given or ascertained areas in inches, multiplied by 0.0443, or the areas in feet multiplied by 6.23, will give the number of gallons equal to the area, by one foot in depth.

EXAMPLE —Required the contents per lineal foot of a 15 in pipe The area given is 176 71 and 176 71 x 0433=7.65 gallons. See p. 16. The contents per foot in depth of a tank 12 ft diam. will be = 113 10 x 62.3 = 704 6 gallons

## STRENGTH OF BUILDING MATERIALS.

(From the London Builder, March, 1873, &c.).

*Crushing weight in lbs. per square inch.*

| | Ordinary. lbs. | Dry. lbs. |
|---|---|---|
| Red deal ... ... | 5750 | 6580 |
| White deal ... ... | 6780 | 7290 |
| Spruce pine ... ... | 6500 | 6820 |
| Mahogany ... ... | 8200 | 8200 |
| Quebec oak ... ... | 4230 | 5980 |
| English oak ... ... | 6480 | 10,050 |
| Pitch pine ... ... | 6790 | 6790 |
| Yellow pine ... ... | 5370 | 5440 |
| Red pine ... ... | 5400 | 7510 |
| Willow ... ... ... | 2900 | 6220 |

The above are picked specimens, without knots or flaws. The highest compression relied upon for pine, is 900, or not more than one-eighth the above tabulated strength.

### MORTAR.

| | lbs. |
|---|---|
| Lime and river sand ... | 436 |
| Lime and pit sand ... ... | 578 |
| Cement and pounded tiles | 670 |

These mortars were 18 months old; they were again tried after 15 years, when the lime mortars had increased one-eighth in strength.

*N.B.—The ascertained pressure borne by stone and brickwork in noted buildings, like the actual pressure trusted to in the use of timber, is about one-eighth of the tabulated strength.*

### MORTAR.

Tensile strength by Vicat.

| | Per sq. in. lbs. |
|---|---|
| Sharp sand and best hydraulic lime ... ... | 136 |
| Do. and common lime ... | 51 |

### GRANITE.

| | Per sq. in lbs. |
|---|---|
| Aberdeen blue ... .. | 10,900 |
| Peterhead ... ... ... | 8,260 |
| Cornish ... ... ... ... | 6,350 |
| Kingstown (Irish) ... | 10,110 |
| Newry ... ... ... | 13,440 |

### BUILDING STONES.

| | |
|---|---|
| Arbroath paving ... ... | 7,880 |
| Caithness ... ... ... | 6,490 |
| Dundee sandstone... ... | 6,630 |
| Craigleith white freestone | 5,480 |
| Bramley fall, near Leeds | 6,050 |
| Derby grit (sandstone) | 04,00 |
| Yorkshire paving ... ... | 5,710 |
| Compact limestone ... | 7,710 |
| Anglesea, ditto ... ... | 7,580 |
| Valencia slate ... ... | 10,940 |
| Basalt, Irish test ... ... | 11,970 |

### BRICKS.

| | Per sq. in. lbs. |
|---|---|
| Pale red ... ... ... ... | 560 |
| Red brick ... ... ... | 800 |
| Yellow face paviors ... | 1,200 |
| Stourbridge firebrick ... | 1,710 |
| North Wales, ditto ... | 2,130 |
| Brickwork in cement, Molesworth ... ... ... | 1,000 |
| Portland cement, Molesworth ... ... ... ... | 1,000 |

### CRUSHING WEIGHT.

| | Per sq. in tons. |
|---|---|
| Cast-iron, mean crushing weight ... ... ... ... | 38 |
| Wrought iron ... ... ... | 18 |
| Ditto, compressive set begins about ... ... ... | 12 |
| Wrought iron, rolled bars | 25 |
| Do. angle iron and straps ... ... ... ... | 24 |
| Wrought plates, lengthwise | 22½ |
| Wrought plates, crosswise | 20 |

TIMBER.—Tensile strength.

| | Per sq. in. lbs. |
|---|---|
| Christiana deal .. .. | 12,900 |
| Elm .. .. .. | 14,400 |
| Mahogany .. .. | 8,000 |
| Oak, English .. .. | 10,000 |
| Pitch Pine .. .. .. | 7,600 |
| Teak .. .. .. | 15,000 |
| Lancewood (Rankine) .. | 23,400 |
| Beech (Molesworth) .. | 20,000 |
| Cedar, W. Indian, do .. | 5,000 |
| Red deal Baltic .. .. | 11,400 |

AUSTRALIAN TIMBER.
Tensile strength, by F. A. Campbell, C.E.

| | Per sq. in. lbs. |
|---|---|
| Blue Gum, Tasmania .. | 26,700 |
| White Gum, Victoria .. | 27,800 |
| Blackwood, Tasmania .. | 25,000 |
| Ironbark, N. S. W. .. | 26,500 |
| Stringy bark, Victoria .. | 23,600 |
| Red, or flooded gum .. | 17,800 |
| Kauri Pine, N. Zealand .. | 10,700 |
| Cedar, Queensland .. | 3,000 |

AUSTRALIAN TIMBERS.

| | Per cubic ft. lbs. |
|---|---|
| Jarrah, just felled .. | 72 |
| Ironbark, do. .. .. | 75 |
| Swamp Gum, do .. .. | 63 |
| Turpentine, do. .. .. | 64 |
| Totara Hokianga N.Z. .. | 62 |
| ,, Puhoi, N.Z. .. .. | 67 |

PORTLAND CEMENT.

Tensile strength.

| | Per sq. in. lbs. |
|---|---|
| Neat cement, 3 tests .. | 470 |
| 1 of cement to 1 of sand, 3 tests .. .. .. | 329 |
| 1 of cement to 2 of sand, 3 tests .. .. .. | 193 |
| 1 of cement to 3 of sand. 3 tests .. .. .. | 140 |

The above are the *average* tests with 3 degrees of fineness, the finest cement being the best in each case. H. Reid's Work, on Portland cement, p. 325.

## To Measure Pipes, Tanks, &c.

The following is a rough and ready way to find the contents of circular tanks, wells, and pipes :—Square the diameter in inches, and cut off the right hand figure as a decimal, and the result will be gallons in each 3 feet (1 yard) of depth, or length, if a pipe—

| Diameter Inches | Pipes, Inches. | Square | Gallons in 3 feet. |
|---|---|---|---|
| 2 .. .. .. .. | 2 × 2 | = 4 or | 0.4 |
| 6 .. .. .. .. | 6 × 6 | = 36 or | 3.6 |
| 12 .. .. .. .. | 12 × 12 | = 144 or | 14.4 |
| WELL OR TANK. | | | |
| 36 .. .. .. .. | 36 × 36 | = 1296 or | 129.6 |
| 100 .. .. .. .. | 100 × 100 | = 10,000 or | 1,000.0 |

## To Find Amount of Interest by Practice.

In calculating Interest, the following table will be found valuable :

| | | | | | |
|---|---|---|---|---|---|
| 1¼ | per cent. is | 1-80th | of 100 | 10 per cent. is | 1 10th of 100 |
| 2 | ,, | ,, 1-50th | ,, | 15 ,, | ,, 3-20ths .. |
| 2½ | ,, | ,, 1-40th | ,, | 20 ,, | ,, 1-5th .. |
| 4 | ,, | ,, 1-25th | ,, | 25 ,, | ,, 1-4th ,, |
| 5 | ,, | ,, 1-20th | ,, | 33⅓ ,, | ,, 1-3rd .. |

## AVERAGE WEIGHT OF BUILDING MATERIALS.

### STONE, &c.,

| *Australian.* | Per cubic foot. lbs. | Cubic feet. per ton. |
|---|---|---|
| Bamaru, Typo, Waurn Ponds and Geelong freestones ... | 134 | 16¾ |
| Kyneton sandstone | 138 | 16¼ |
| Western Port, do. | 148 | 15¼ |
| Spring Bay ditto ... | 140 | 16 |
| Point Ventenet, do ... | 145 | 15½ |
| Grampian Sandstone | | 14½ |
| Sydney sandstone ... | 140 | 16 |
| Bluestone (basalt) | 161 | 14 |
| Granite, grey or red | 167 | 13½ |
| Marble, Adelaide ... | 169 | 13¼ |
| Rubble ballast and metal, see page 20 | | |
| Brickwork, see page 40, dry about ... | 124 | 18 |
| Sand (sharp) about | 95 | 23 |
| Clay, mild brick earth | 120 | 17 |
| „ strong and stiff | 135 | 16½ |
| Mortar, dry ... .. | 93 | 24 |
| *English, &c.* | | |
| Bath (Oolite) .. | 140 | 16 |
| Portland, do. ... | 153 | 14⅔ |
| Craigleith, sandstone | 149 | 15 |
| Caen, French freestone ... ... | 132 | 16½ |
| Granite, Aberdeen ... | 16 | 13⅔ |
| Marble, Carrara ... | 170 | 13¼ |
| Cast iron ... ... | 464 | 4.83 |
| Wrought iron .. | 477 | 4.70 |

### FLAGGING.

| In. | | Ft. sup. p. ton. |
|---|---|---|
| 2 | Yorkshire ... ... | 86 |
| 2½ | Do. ... ... | 70 |
| 3 | Do. .. ... | 57 |
| 2 | Arbroath ... ... | 87 |
| 2½ | Caithness ... ... | 68 |
| 1 | Slate, Welch ... ... | 160 |
| 1½ | Do. ... ... .. | 107 |
| 1 | Marble slabs, black ... | 165 |
| 1 | Do., white or veined | 160 |

### AUSTRALIAN FLAGGING.

| In. | | Ft. sup. p. ton. |
|---|---|---|
| 4 | Sydney sandstone ... | 48 |
| 3 | Sawn bluestone ... | 84 |
| 2½ | Ditto ... ... | 70 |
| 2 | Ditto ... ... | 56 |

### TIMBER.

| *British, &c..* | Per cubic foot lbs. | Cubic feet per ton. |
|---|---|---|
| Red or white American pine (seasoned ... . | 34 | 66 |
| Yellow pine, Baltic, (seasoned) ... | 35 | 64 |
| Red pine, Riga do. ... | 33 | 62 |
| Pitch pine (seasoned) | 39 | 57½ |
| Cedar, Spanish American (seasoned) ... | 30 | 75 |
| Mahogany, Spanish | 36 | 34 |
| Mahogany, Honduras or Baywood ... | 40 | 56 |
| Oak, just felled ... | 68 | 33 |
| Oak, of commerce ... | 57½ | 39 |
| Oak, well seasoned .. | 48 | 47 |
| Elm, just felled ... | 58 | 38 |
| Elm, well seasoned... | 42 | 53 |
| Teak, Indian, do ... | 42 | 53 |
| *Australian.* | | |
| Cedar, N. S. Wales market cut ... | 36 | 62 |
| Kauric Pine, New Zealand market cut | 40 | 56 |
| Hardwood, market cut, about... ... | 56 | 40 |
| Iron bark and box, just felled ... | 70 | 32 |
| Blue or red gum, do. | 65 | 34½ |
| Stringy bark and blackwood, do. ... | 64 | 35 |

WATER, *rain or pure, at* 63 deg.

62½ lbs., or 6¼ gallons, one cubic foot.

10 lbs., or 277¼ c. ins., one gallon.

35·85 c ft., or 224 gallons, one ton.

8 gallons or 1 ft. 3½-12ths cube, one bushel.

| Roofing, *per square.* | Cwt. |
|---|---|
| Slates, 4 in. lap ... ... ... | 6 |
| Palings, half 5 or 6 ft., | 3 to 4 |
| Shingles ... ... ... | 2½ to 3 |
| Zinc, plain, 8 to 12 gauge | ⅝ to 1¼ |
| Gal. corrugated Iron, 26 and 24 gauges lapped 2 corrugations ... | 1 to 1½ |

Lead—add 00 to the lbs. per foot for the lbs. per square (multiply by 100) and allow for laps.

The rolls are generally about 30 feet by 7 feet.

| Floors, *per square.* | Cwt. |
|---|---|
| 1 in. wrought Amer, red or white pine... .. .. .. | 2 |
| 1⅛ in. rought Baltic red pine ... ... ... ... .. | 2⅜ |
| 1 in ditto pitch pine... .. | 2⅛ |
| 1 in Colonial Pine, T. & G. | 2½ |
| Ditto, hardwood, dressed.. | 4 |

Floors should be made strong enough to bear the following weights per foot sup. The scantlings may be calculated from the Tables of hardwood, &c. See Index.

| | Cwt. |
|---|---|
| Private or ordinary rooms, etc. from | 1 to 2 |
| Public rooms for meetings, halls, theatres, etc. ... .. | 2½ |
| Warehouses or stores, railway or wharf platforms or landings, road bridges, or railway *over* bridges. .. | 3 |
| Railway bridges or viaducts | 5 |

Sundries.

| | |
|---|---|
| Laths, split hardwood or sawn pine, 4 ft p. M | 2 to 2½ |
| Posts and Rails, viz., 25 posts and 75 rails market cut ... ... ... ... | 30 to 35 |
| Palings, 5 ft per C., | 3 to 4½ |
| ,, 6 do. do from | 4 to 6 |
| Shingles, hardwood, p M. | 3 |

Sundries.

Washing coppers each see Index
Vulcanised Indian rubber ., ,,
Rod and bar iron, see Index.
Metals, per sup ft., see Index
Ropes and chains, see Index.
Cast Iron pipes, see Index.

| Cast Iron Spouting. | | | | lbs |
|---|---|---|---|---|
| 4 in. ½ round p. length of 6 ft | | | | 16 |
| 4½ in. do | | do. | | 17 |
| 5 in. do. | | do. | | 18 |
| | 2 in. lbs. | 2½ in. lbs. | 3 in. lbs. | 4 in. lbs. |
| Cast iron down pipes (6 ft.) | 16 | 20¼ | 23 | 38½ |
| Swan necks ea. | 3¾ | 4 | 7½ | 11 |
| Heads, each ... | 7 | 7½ | 8 | 41 |
| Shoes, each ... | 1¾ | 2¾ | 4 | 7 |

| Metals, *per cubic inch.* | lbs. |
|---|---|
| Iron bar ... ... ... | 0·279 |
| Iron or tin, cast ... ... | 0·263 |
| Steel, hard .. ... | 0·283 |
| Lead ... ... ... | 0 411 |
| Copper, cast .. .. | 0·318 |
| Brass, cast ... ... | 0·304 |
| Zinc, cast... ... ... | 0·26 |
| Gun metal ... ... | 0 31 |

| Lime, Cement, &c | lbs. |
|---|---|
| Lime, heads, p bag 3 bus. | 180 |
| Do. Geelong roche do. ... | 200 |
| Cement, Portland, p. cask of 3½ bushels ... .. | 400 |
| Cement, (Keene's marble p. cask of 3½ bushels ... | 300 |
| Plaster of Paris, p. ck. 3½ bushels ... .. ... | 310 |

| Bricks, *per cubic foot.* | |
|---|---|
| London stocks ... ... | 115 |
| Welsh or other fire bricks | 150 |
| Melbourne, white or red ... | 131 |
| Ditto, white pressed ... | 136 |

| Paving Tiles, etc., *each* | lbs. |
|---|---|
| Australian 9 in., 7lbs.; 12in. | 14 |
| Earthenware drain pipes, see In | |

## N.S.W. RAILWAY TRUCK CAPACITY.

### Shewing Concessions.

| Truck. | Capacity. | | Lengths not exceeding. | Average Weight. | Concession |
|---|---|---|---|---|---|
| | Oregon or Kauri. | Hardwood. | | | |
| | Super. | Super. | | | |
| D. 6 ton .. | 3,200ft | 1,600ft | 24ft | 4 tons | No Conces'n |
| D. 8 ton .. | 4,800ft | 2,400ft | 24ft | 6 ,, | |
| E. Set .. | 6,400ft | 3,200ft | 28ft | 8 ,, | 10 per cent. |
| F. Set .. | 14,400ft | 7,200ft | 28ft | 18 ,, | reduction |
| G. Set .. | 9,600ft | 4,800ft | 27ft | 12 ,, | on usual |
| M. Set .. | 14,400ft | 7,200ft | 34ft | 18 ,, | rates. |

## APPROXIMATE WEIGHT OF TIMBER, &c.

### Per Ton Weight.

| | | | |
|---|---|---|---|
| Hardwood .. | 360ft. super. | Cedar .. | 700ft. super. |
| Oregon .. .. | 800ft. ,, | ⅞ Baltic Flooring | 1000ft. ,, |
| Kauri .. .. | 750ft. ,, | ¾ ,, Lining | 1200ft. ,, |
| Redwood .. | 600ft. ,, | ½ ,, ,, | 1600ft. ,, |
| 5ft. Sawn H'dwood Palings, | 350 count | Doors average | 50 count |
| 6ft. ,, ,, ,, | 300 ,, | Stock Sashes, av. | 100 pairs |
| Hardwood Pickets | 500 ,, | Bricks, ordinary | 333 ,, |

## WEIGHTS OF MATERIALS AND METALS.

### Weight in lbs. of one Cubic foot.

| | | | |
|---|---|---|---|
| Asphalte .. .. .. | 155lbs. | Coke .. .. .. | 41lbs. |
| Common Earth .. | 95 to 125lbs. | Emery .. .. .. | 250lbs. |
| Clay .. .. .. | 125lbs. | Flint .. .. .. | 164lbs. |
| Limestone .. .. | 140lbs. | Glass (plate) .. .. | 169lbs. |
| Coal (Solid) .. .. | 80lbs. | Terra Cotta (Solid) .. | 122lbs. |
| Coal (Loose) .. .. | 52lbs. | | |

Metals.

| | | | |
|---|---|---|---|
| Milled Lead .. .. | 711.5lbs. | Wrought Iron .. | 480lbs. |
| Cast Lead .. .. | 709lbs. | Tin .. .. .. | 460lbs. |
| Copper .. .. | 539.6lbs. | Cast Iron .. .. | 450lbs. |
| Sheet Copper .. .. | 548lbs. | Zinc .. .. .. | 440lbs. |
| Drawn Copper .. .. | 555lbs. | Bronze .. .. | 512lbs. |
| Brass (Drawn) .. .. | 524lbs. | Bell Metal .. .. | 545lbs. |
| Steel .. .. .. | 494lbs. | | |

## THE NATURAL ANGLE OF REST FOR MATERIAL EXCAVATED.

| | | | |
|---|---|---|---|
| Dry Sand, Sheltered | 22 degrees | Clay .. .. | 45 degrees. |
| Wet Sand .. .. | 38 ,, | Rubble or Mine Tips | 45 ,, |
| Earth or Soil .. | 30 ,, | River Shingle | 40 ,, |

# EXCAVATOR.

Foundation trenches should be kept separate, and estimated apart from other building excavation. Take the full length and width of bottom footings; multiply by the depth from surface. By reference to Table, the cubic contents of length and width by one foot deep can be ascertained at a glance. Then multiply by the depth required.

This Table is also useful in finding capacity for square tanks, sinking, or other excavation, by multiplying and adding.

## SOLID OR CUBIC MEASURE.

1,728 cubic inches .. .. .. .. = 1 cubic foot
27 cubic feet .. .. .. .. .. = 1 cubic yard.

## WEIGHT OF EARTHS AND ROCKS.
### Per Cubic Yard.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 cub. yd. | Earth weighs | 26 cwt. | | 1 cub. yd. | Sandstone, weighs | 36 ct. | |
| 1 ,, | Sand ,, | 30 ,, | | 1 ,, | Marl, Clay or Shale | 38 ,, | |
| 1 ,, | Ironstone Gvl. | 36 ,, | | 1 ,, | Quartz | 41 ,, | |
| 1 ,, | Quartz Gravel | 30 ,, | | 1 ,, | Trachyte .. | 43 ,, | |
| 1 ,, | Clay .. | 31 ,, | | 1 ,, | Granite .. | 43 ,, | |
| 1 ,, | Mud, wet | 35 ,, | | 1 ,, | Slate .. | 44 ,, | |

## A FAIR DAY'S WORK FOR A NAVVY—8 HOURS.

Pick and Shovel work :—3 to 5 cubic yards stiff soils ; 7 to 10 cubic yards ordinary loams ; 10 to 16 cubic yards sandy soils.

An ordinary tip cart, empty, weighs 10 cwt., and holds about 23 cubic feet loose shale, or 12 cubic feet in the solid ; thus taking 2¼ loads to the cubic yard in the solid ; usual filling about 5 loads to 2 cubic yards solid.

Ten navvy barrow loads to the cubic yard.

## PLOUGH AND SCOOP WORK.

A plough, with four horses or six bullocks and two men, at 40/– per day, will loosen from 200 cubic yards, at a cost of 2 2/5d.

A scoop, about 54 cubic yards, generally, or about –/9d., it all depends upon the distance earth is deposited. For instance :—A square tank in hard black soil of the plains, 80 feet square at the top, 40ft. square at bottom, battered sides, 10 feet deep, containing 14.00 cubic yards, cost £85, or about 1/2½ per yard.

Another tank, soil 120 feet x 12 feet deep, 60 feet bottom, 48 feet battered sides, slopes 1ft. in 1ft., containing 2,200 cubic yards ; 6 bullocks, with plough and scoop, going through the hole backwards and forwards, and depositing soil each end on bank, 10 yards from edge, cost £110, or about 1/– per cubic yard.

**Special Excavation,** as under, cost :—A Curved Trench, 20 feet radius, with plumb picked sides, sunk in hard shale, containing ironstone bands for water-main pipe—

7ft. x 6ft. x 8ft. deep = 336 cubic feet = 12½ cubic yards, actual cost, 5/– per c. yard.

8ft. x 6ft. x 5ft., straight, cost, 3/– per c. yard.

Filling in above, and ramming in 6in. layers, 1/6 per cubic yard.

## EXCAVATOR'S WORK.

**Per cubic yard, including plant, powder, &c.**

*Wages*, 1/– per hour.

| | s. | d. |
|---|---|---|
| 1. Sand or loose soil, shovel work, getting and casting .. .. | 0 | 6 |
| 2. Hard ditto. or loam pick and shovel work, ditto .. .. | 0 | 9 |
| 3. Wet mud, sand, or silt, getting and casting .. .. .. | 0 | 10 |
| 4. Getting and casting, or filling into drays, earth, &c., not more than six feet deep, *pick and shovel work* .. .. .. | 1 | 0 |
| 5. Ditto, from 6 to 12 feet deep, ditto .. .. .. .. | 1 | 4 |
| 6. Ditto, from 12 to 18 feet deep, ditto .. .. .. .. | 1 | 8 |
| If in stiff clay or hard gravel, add to items 4 and 5 .. .. | 0 | 3 |
| If in soft rock or loose boulders, add ditto .. .. .. | 0 | 6 |
| If in hard sandstone or shale, add ditto .. .. .. .. | 1 | 3 |
| If in compact bluestone or trap, add ditto .. .. .. | 2 | 6 |
| If in compact granite, gneiss, or sienite, add ditto .. .. | 4 | 0 |
| If wheeled one *run* of 20 yards, add .. .. .. .. | 0 | 3 |
| Ditto for every additional *run*, add .. .. .. .. | 0 | 3 |

N.B.—If the excavation is from the face of an open cutting, the cost will be the same as if not more than 6 feet deep as per 4th item. This work is facilitated by partly undermining and then wedging down with iron bars or *feathers*.

Items 5 and 6 are only used when the earth is raised to the surface in lifts, as in cellars or basements, gasholders, &c. If these holes are large enough, the best way is to cart the stuff by a spiral road, gradually descending towards the bottom, and then raise the earth, &c., forming the temporary road, by lifts or barrows with planks.

In excavating for covered Reservoirs on hills, the gullets, or tunnels, required for the inlet and outlet pipes may be used as inclines for the removal of the earth, shale, &c., from the side of Reservoir, and afterwards for carting the materials, &c., required for the lining, into the Reservoir.

The prices for excavating include the use of plant on a small scale, but if expensive plant has to be bought for one contract only, it would not pay at these prices :—

## FOUNDATION, TRENCHES, TANKS.

| | s. | d. |
|---|---|---|
| Getting out trenches for foundations of walls for buildings, levelling and stepping ; bottom part refilled and rammed, and the remainder spread as required per cubic yard. .. | 2 | 6 |
| Ramming ground in layers around wall in embankments, add to above prices .. .. .. .. .. .. .. | 0 | 6 |
| Forming open tanks or waterholes for sheep or cattle, up to 12 feet deep in clay .. .. .. .. .. .. .. | 1 | 3 |

## NUMBER OF CUBIC YARDS IN FOUNDATION TRENCHES, CONCRETE, OR EXCAVATED WORK FOR EVERY FOOT DEEP.

### Results in Cubic Yards and Decimals.

| Length Trench in feet. | WIDTH OF TRENCH. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | inches. | | | | feet. | | | | | | | | | | |
| | 12 | 15 | 18 | 21 | 2 | 2½ | 3 | 3½ | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 6 | .2 | .2 | .3 | .3 | .4 | .5 | .7 | .8 | .9 | 1.1 | 1.3 | 1.5 | 1.7 | 2. | 2.2 |
| 7 | .2 | .3 | .4 | .4 | .5 | .6 | .8 | .9 | 1. | 1.3 | 1.5 | 1.8 | 2. | 2.4 | 2.6 |
| 8 | .3 | .3 | .4 | .5 | .6 | .7 | .9 | 1. | 1.2 | 1.5 | 1.8 | 2. | 2.4 | 2.6 | 3. |
| 9 | .3 | .4 | .5 | .6 | .7 | .8 | 1. | 1.2 | 1.3 | 1.6 | 2. | 2.4 | 2.6 | 3. | 3.4 |
| 10 | .3 | .4 | .5 | .6 | .7 | .9 | 1.1 | 1.3 | 1.5 | 1.8 | 2.2 | 2.6 | 3. | 3.4 | 3.7 |
| 11 | .4 | .5 | .6 | .7 | .8 | 1. | 1.2 | 1.4 | 1.6 | 2. | 2.4 | 2.8 | 3.2 | 3.7 | 4.1 |
| 12 | .4 | .5 | .6 | .7 | .9 | 1.1 | 1.3 | 1.5 | 1.8 | 2.2 | 2.6 | 3. | 3.5 | 4. | 4.4 |
| 13 | .5 | .6 | .7 | .8 | 1. | 1.2 | 1.4 | 1.7 | 1.9 | 2.4 | 2.9 | 3.4 | 3.8 | 4.3 | 4.8 |
| 14 | .5 | .6 | .7 | .9 | 1. | 1.3 | 1.5 | 1.8 | 2. | 2.5 | 3.1 | 3.6 | 4.1 | 4.7 | 5.2 |
| 15 | .5 | .6 | .8 | .9 | 1.1 | 1.4 | 1.7 | 1.9 | 2.2 | 2.7 | 3.3 | 3.9 | 4.4 | 5. | 5.5 |
| 16 | .6 | .7 | .9 | 1. | 1.2 | 1.5 | 1.8 | 2. | 2.3 | 2.9 | 3.5 | 4.1 | 4.7 | 5.3 | 5.9 |
| 17 | .6 | .7 | .9 | 1.1 | 1.3 | 1.6 | 1.9 | 2.2 | 2.5 | 3.1 | 3.8 | 4.4 | 5. | 5.7 | 6.3 |
| 18 | .6 | .8 | 1. | 1.1 | 1.3 | 1.6 | 2. | 2.3 | 2.6 | 3.3 | 4. | 4.6 | 5.3 | 6. | 6.6 |
| 19 | .7 | .8 | 1. | 1.2 | 1.4 | 1.7 | 2.1 | 2.4 | 2.8 | 3.5 | 4.2 | 4.9 | 5.6 | 6.3 | 7. |
| 20 | .7 | .9 | 1.1 | 1.3 | 1.5 | 1.8 | 2.2 | 2.6 | 2.9 | 3.7 | 4.4 | 5.2 | 5.9 | 6.6 | 7.4 |
| 21 | .7 | .9 | 1.1 | 1.3 | 1.5 | 1.9 | 2.3 | 2.6 | 3.1 | 3.9 | 4.5 | 5.3 | 6.2 | 7. | 7.8 |
| 22 | .8 | 1. | 1.2 | 1.4 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 4.1 | 4.9 | 5.7 | 6.5 | 7.3 | 8.1 |
| 23 | .8 | 1. | 1.2 | 1.4 | 1.7 | 2.1 | 2.5 | 2.9 | 3.4 | 4.2 | 5.1 | 5.9 | 6.8 | 7.6 | 8.5 |
| 24 | .8 | 1.1 | 1.3 | 1.5 | 1.8 | 2.2 | 2.6 | 3. | 3.5 | 4.4 | 5.2 | 6.1 | 7.1 | 8. | 8.8 |
| 25 | .9 | 1.1 | 1.4 | 1.6 | 1.8 | 2.3 | 2.7 | 3.2 | 3.6 | 4.6 | 5.5 | 6.4 | 7.4 | 8.3 | 9.2 |
| 26 | .9 | 1.2 | 1.5 | 1.6 | 1.9 | 2.4 | 2.9 | 3.3 | 3.8 | 4.8 | 5.8 | 6.7 | 7.7 | 8.6 | 9.6 |
| 27 | 1. | 1.5 | 1.5 | 1.7 | 2. | 2.5 | 3. | 3.6 | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
| 28 | 1.0 | 1.0 | 1.5 | 1.8 | 2.1 | 2.5 | 3.1 | 3.6 | 4.1 | 5.1 | 6.2 | 7.3 | 8.3 | 9.3 | 10.3 |
| 29 | 1.0 | 1.3 | 1.6 | 1.8 | 2.1 | 2.6 | 3.2 | 3.7 | 4.3 | 5.3 | 6.4 | 7.5 | 8.5 | 9.6 | 10.7 |
| 30 | 1.1 | 1.3 | 1.8 | 1.9 | 2.2 | 2.7 | 3.4 | 3.8 | 4.4 | 5.5 | 6.6 | 7.7 | 8.8 | 10. | 11.1 |
| 31 | 1.1 | 1.4 | 1.7 | 2. | 2.3 | 2.8 | 3.4 | 4. | 4.6 | 5.7 | 6.8 | 8. | 9.2 | 10.3 | 11.5 |
| 32 | 1.1 | 1.4 | 1.7 | 2. | 2.4 | 2.9 | 3.5 | 4.1 | 4.7 | 5.9 | 7.1 | 8.3 | 9.5 | 10.6 | 11.8 |
| 33 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 3. | 3.6 | 4.2 | 4.9 | 6.1 | 7.3 | 8.5 | 9.8 | 11. | 12.2 |
| 34 | 1.2 | 1.5 | 1.8 | 2.2 | 2.5 | 3.1 | 3.7 | 4.4 | 5. | 6.3 | 7.5 | 8.8 | 10.1 | 11.4 | 12.6 |
| 35 | 1.3 | 1.6 | 1.9 | 2.2 | 2.6 | 3.2 | 3.9 | 4.5 | 5.1 | 6.5 | 7.8 | 9. | 10.4 | 11.7 | 13. |

## NUMBER OF CUBIC YDS. IN FOUNDATION TRENCHES, &c.—*contd.*

### Results in Cubic Yards and Decimals.

| Length Trench in feet. | WIDTH OF TRENCH. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | inches. | | | | feet. | | | | | | | | | | |
| | 12 | 15 | 18 | 21 | 2 | 2½ | 3 | 3½ | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 36 | 1.3 | 1.6 | 2.0 | 2.3 | 2.6 | 3.3 | 4. | 4.6 | 5.3 | 6.6 | 8. | 9.3 | 10.6 | 12. | 13.3 |
| 37 | 1.3 | 1.7 | 2. | 2.4 | 2.7 | 3.4 | 4.1 | 4.8 | 5.5 | 6.8 | 8.2 | 9.6 | 10.9 | 12.3 | 13.7 |
| 38 | 1.4 | 1.7 | 2.1 | 2.4 | 2.8 | 3.5 | 4.2 | 4.9 | 5.6 | 7. | 8.4 | 9.8 | 11.2 | 12.6 | 14. |
| 39 | 1.4 | 1.8 | 2.1 | 2.5 | 2.8 | 3.6 | 4.3 | 5. | 5.8 | 7.2 | 8.6 | 10. | 11.5 | 13. | 14.4 |
| 40 | 1.4 | 1.8 | 2.2 | 2.5 | 2.9 | 3.7 | 4.4 | 5.1 | 5.9 | 7.4 | 8.8 | 10.3 | 11.8 | 13.3 | 14.8 |
| 41 | 1.5 | 1.9 | 2.2 | 2.6 | 3. | 3.8 | 4.5 | 5.3 | 6.1 | 7.6 | 9. | 10.6 | 12.1 | 13.6 | 15.2 |
| 42 | 1.5 | 1.9 | 2.3 | 2.7 | 3.1 | 3.9 | 4.6 | 5.4 | 6.2 | 7.7 | 9.3 | 10.8 | 12.4 | 14. | 15.5 |
| 43 | 1.6 | 1.9 | 2.3 | 2.7 | 3.1 | 3.9 | 4.7 | 5.5 | 6.3 | 7.9 | 9.5 | 11.1 | 12.7 | 14.3 | 15.9 |
| 44 | 1.6 | 2. | 2.4 | 2.8 | 3.2 | 4. | 4.8 | 5.6 | 6.5 | 8.1 | 9.7 | 11.3 | 13. | 14.6 | 16.2 |
| 45 | 1.6 | 2.1 | 2.5 | 2.9 | 3.3 | 4.1 | 4.9 | 5.8 | 6.7 | 8.3 | 9.9 | 11.6 | 13.3 | 15. | 16.6 |
| 46 | 1.7 | 2.1 | 2.6 | 2.9 | 3.4 | 4.2 | 5.1 | 5.9 | 6.8 | 8.5 | 10.2 | 11.9 | 13.6 | 15.3 | 17. |
| 47 | 1.7 | 2.1 | 2.6 | 3.0 | 3.4 | 4.3 | 5.2 | 6.0 | 7.0 | 8.7 | 10.4 | 12.1 | 13.9 | 15.6 | 17.4 |
| 48 | 1.8 | 2.2 | 2.7 | 3.1 | 3.5 | 4.5 | 5.3 | 6.2 | 7.1 | 8.9 | 10.6 | 12.4 | 14.2 | 16. | 17.8 |
| 49 | 1.8 | 2.2 | 2.7 | 3.1 | 3.5 | 4.5 | 5.4 | 6.3 | 7.3 | 9.1 | 10.8 | 12.7 | 14.5 | 16.3 | 18.1 |
| 50 | 1.8 | 2.3 | 2.7 | 3.2 | 3.6 | 4.6 | 5.5 | 6.4 | 7.4 | 9.2 | 11.1 | 12.9 | 14.8 | 16.6 | 18.4 |
| 51 | 1.9 | 2.3 | 2.8 | 3.2 | 3.7 | 4.7 | 5.6 | 6.5 | 7.6 | 9.3 | 11.3 | 13.1 | 15.1 | 17. | 18.8 |
| 52 | 1.9 | 2.4 | 2.8 | 3.3 | 3.8 | 4.8 | 5.7 | 6.7 | 7.7 | 9.6 | 11.5 | 13.4 | 15.4 | 17.3 | 19.2 |
| 53 | 1.9 | 2.4 | 2.9 | 3.4 | 3.9 | 4.9 | 5.9 | 6.8 | 7.9 | 9.8 | 11.7 | 13.7 | 15.7 | 17.6 | 19.6 |
| 54 | 2. | 2.5 | 3. | 3.5 | 4. | 5. | 6. | 7. | 8. | 10. | 12. | 14. | 16. | 18. | 20. |
| 55 | 2. | 2.5 | 3. | 3.5 | 4.1 | 5.1 | 6.1 | 7.1 | 8.2 | 10.2 | 12.2 | 14.3 | 16.3 | 18.3 | 20.4 |
| 56 | 2. | 2.6 | 3.1 | 3.6 | 4.1 | 5.2 | 6.2 | 7.2 | 8.3 | 10.4 | 12.4 | 14.5 | 16.6 | 18.6 | 20.7 |
| 57 | 2.1 | 2.6 | 3.2 | 3.7 | 4.2 | 5.3 | 6.3 | 7.4 | 8.5 | 10.6 | 12.6 | 14.8 | 16.9 | 19. | 21.1 |
| 58 | 2.1 | 2.7 | 3.2 | 3.7 | 4.3 | 5.4 | 6.5 | 7.5 | 8.6 | 10.7 | 12.8 | 15. | 17.1 | 19.3 | 21.5 |
| 59 | 2.2 | 2.7 | 3.2 | 3.8 | 4.3 | 5.5 | 6.5 | 7.6 | 8.8 | 10.9 | 13. | 15.3 | 17.4 | 19.6 | 21.9 |
| 60 | 2.2 | 2.7 | 3.3 | 3.8 | 4.4 | 5.5 | 6.6 | 7.7 | 8.9 | 11.1 | 13.3 | 15.5 | 17.7 | 20. | 22.2 |
| 61 | 2.3 | 2.8 | 3.3 | 3.9 | 4.5 | 5.6 | 6.7 | 7.9 | 9.1 | 11.3 | 13.5 | 15.8 | 18. | 20.3 | 22.6 |
| 62 | 2.3 | 2.8 | 3.4 | 4. | 4.6 | 5.7 | 6.9 | 8. | 9.2 | 11.5 | 13.7 | 16. | 18.3 | 20.6 | 22.9 |
| 63 | 2.3 | 2.9 | 3.5 | 4. | 4.6 | 5.8 | 7. | 8.1 | 9.3 | 11.6 | 13.9 | 16.3 | 18.6 | 21. | 23.3 |
| 64 | 2.4 | 2.9 | 3.5 | 4.1 | 4.7 | 5.9 | 7.1 | 8.2 | 9.5 | 11.8 | 14.2 | 16.5 | 18.9 | 21.3 | 23.6 |
| 65 | 2.4 | 3. | 3.6 | 4.2 | 4.8 | 6. | 7.2 | 8.4 | 9.6 | 12. | 14.4 | 16.8 | 19.2 | 21.6 | 24. |
| 70 | 2.6 | 3.2 | 3.8 | 4.4 | 5.2 | 6.5 | 7.8 | 9. | 10.2 | 13.1 | 15.6 | 18. | 20.8 | 23.4 | 26. |
| 80 | 2.8 | 3.6 | 4.4 | 5. | 5.8 | 7.4 | 8.8 | 10.2 | 11.8 | 14.8 | 17.6 | 20.6 | 23.6 | 26.6 | 29.6 |
| 90 | 3.2 | 4.2 | 5.0 | 5.8 | 6.6 | 8.2 | 9.8 | 11.6 | 13.4 | 16.6 | 19.8 | 23.2 | 26.6 | 30. | 33.2 |
| 100 | 3.6 | 4.6 | 5.4 | 6.4 | 7.2 | 9.2 | 11. | 12.8 | 14.8 | 18.4 | 22.2 | 25.8 | 29.6 | 33.2 | 36.8 |
| 200 | 7.2 | 9.2 | 10.8 | 12.8 | 14.4 | 18.4 | 22. | 25.6 | 29.6 | 36.8 | 44.4 | 51.6 | 59.2 | 66.4 | 73.6 |

### EXCAVATION PRICES FOR BUILDINGS GENERALIZED.

| | | | |
|---|---|---|---|
| Excavation in Earth, including wheeling 40 yards, spreading, levelling, filling in and ramming | 0 | 2 | 0 |
| Ditto. ditto. in trenches 2ft. to 4ft. wide | 0 | 2 | 3 |
| Excavation in Sandstone, including wheeling, 40 yards | 0 | 5 | 0 |
| Channelling in Sandstone, per foot super. | 0 | 1 | 0 |
| Levelling and scabbling in Sandstone, bottom of trenches, per foot super. | 0 | 0 | 6 |

**Reservoir dams from "Molesworth."**—Width at top in low dams should be equal to the height. Breast or inside slopes, 3 to 1; back slopes, 2 to 1. Height above surface of water not less than 3½ feet.

Getting and raising coal (thick seams), per ton from 3s. 6d. to 6s. 0d.
(Machine Undercutters not used.)

### CARTAGE PER ONE-HORSE LOAD.

**Horse, dray, and driver, 1s. 6d. per hour.**

| | s. | d. |
|---|---|---|
| Carting, tipping, and levelling, *lead* not more than quarter mile, per cubic yard | 0 | 8 |
| Ditto, from quarter to half mile *lead*, ditto | 1 | 0 |
| Add for every extra half mile, ditto ditto | 0 | 8 |
| Filling earth spoil, carting 1½ miles and tipping, per load | 2 | 3 |
| Ditto, white hard metal in spawls, loaded and delivered 3 miles | 3 | 6 |

(Along metalled road.)

Ordinary single horse drays contain about 18 bushels, or 23 cubic feet.

### INCREASE OF EARTH WHEN EXCAVATED.

Rock or shale increases in bulk from the solid about double; therefore, to obtain the price for leading per cubic yard in cutting, reckon about 2¼ times the above prices.

For hard clay, loam, gravel, conglomerate, and similar dense materials, reckon 1¾ times the above prices.

If Dobbin carts of similar size to above drays are used, there will be a saving in the loading, because of the less height the stuff has to be lifted. If the leads are short, say less than 4 chains, barrowing with planks will be still cheaper, the height of the barrows being even lower than the Dobbin carts.

### CARTAGE, PER TON.

| | | |
|---|---|---|
| Cartage on bad roads, per ton, per mile | 1s. to | 2 0 |
| Ditto, on good roads ditto | 9d. to | 1 0 |
| *Haulage* on Railway, cheapest rates, ditto | 1d. to | 1½d. |
| *Freight* by coasting steamers do. do. | | ¼d. |

A horse can draw about 8 tons on an ordinary railway, and 4 tons on a horse-railway, with 6 × 3 hardwood rails.

## RAILWAY AND EXTENSIVE WORKS.

In the following Tables on Excavation, the earth, rock, &c., excavated are reckoned in *situ*, *i.e.*, in its undisturbed and natural state.

With wages at 1s. per hour, and horse, dray and driver at 1s. 6d. per hour.

**Cuttings and Embankments.**—In equalising the contents of cuttings and embankments for roads, railways, &c., it is not usual to make any allowance for the increased bulk of loose material, except in increasing the height of the embankments for settlement, the extent of which will depend upon the material, rock settling down the least and wet clay the most ; it is always considered favorable to the contractor to pay him for embankments, if he has taken the work by the cubic yard.

### Proportion of getters, fillers, and wheelers, for run of 40 yards.

| | Getters. | Fillers. | Wheelers. |
|---|---|---|---|
| In loam, earth, sand, gravel, clay, &c. .. | 1 | 1 | 1 |
| Hard earth, or gravel, marl, &c. .. .. | 1 | 2 | 2 |
| Hard clay, loose shale, &c. .. .. .. | 1 | 1¼ | 1¼ |
| Rock, if blasted, or broken up, from .. | 3 | 1 | 1 |

## MEASUREMENT OF EARTHWORK.

In the measurement of cuttings and embankments with slopes, the common system of average heights gives less, and the common system of average areas gives more than the true contents ; the proper system is by the *prismoidal formula*, from which the annexed table for the measurement of earthwork is calculated, but even in this case the cross section is presumed to be perfectly level, the slopes to be quite true, and the change from chain to chain regular and gradual, otherwise the measurement is incorrect.

To show the necessity of correctly ascertaining the cubical contents of earth-work, where the contractor tenders for a *lump* sum, I have taken the following from M'Neil's Earthwork Tables, which are calculated from the *prismoidal formula* :—

" In calculating the contents of embankments and cuttings in a section, the true content of which is 332,390 cubic yards, by the common methods of mean heights is only 310,652 cubic yards, thus making 21,738 cubic yards less than the true content ; by the common method of mean areas the error in excess will be 43,487 cubic yards."

**Prismoidal Formula.**—Average area equal to four times the middle area added to the sum of the end areas and divided by six. In using the following constants instead of dividing the sum of the areas by six, multiply them by the following constants for the length required in chains :—

Sum of areas in feet multiplied by 0·204—cubic yards in ½ chain.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ,, | ,, | ,, | 0·408 | ,, | ,, | 1 | ,, |
| ,, | ,, | ,, | 0·612 | ,, | ,, | 1½ | ,, |
| ,, | ,, | ,, | 0·815 | ,, | ,, | 2 | ,, |
| ,, | ,, | ,, | 1·223 | ,, | ,, | 3 | ,, |
| ,, | ,, | ,, | 1·630 | ,, | ,, | 4 | ,, |
| ,, | ,, | ,, | 2·037 | ,, | ,, | 5 | ,, |
| ,, | ,, | ,, | 2·445 | ,, | ,, | 6 | ,, |

The ends of cuttings on sidelong ground always form a pyramid, for which multiply the area of the base by one-third the length.

In light or shallow cuttings and embankments for railways, roads or tramways, the common average area will be sufficiently near for tendering, as it gives an excess in measurement in proportion to the inequalities of the heights. If the heights are given at every chain, "Bidder's Tables" will give the readiest and most correct measurements to the nearest foot in height, if the cross section of ground is tolerably level.

**Earthwork, Rock, &c.**, at per cubic yard. Excavators at 1s., horse, dray and driver at 1s. 6d. per hour.

| Lead in yds. | Light Soil. | Loam. | Heavy Soil. | Stiff Clay. | Shale. | Hard Rock. |
|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d |
| 33 | 1 0 | 1 2 | 1 3 | 1 6 | 3 2 | 5 0 |
| 67 | 1 1 | 1 3 | 1 4 | 1 7 | 3 4 | 5 2 |
| 100 | 1 2 | 1 4 | 1 5 | 1 8 | 3 6 | 5 3 |
| 150 | 1 3 | 1 5 | 1 7 | 1 10 | 3 8 | 5 5 |
| 200 | 1 4 | 1 6 | 1 8 | 1 11 | 3 10 | 5 7 |
| 250 | 1 5 | 1 7 | 1 9 | 2 0 | 4 0 | 5 8 |
| 300 | 1 6 | 1 8 | 1 10 | 2 1 | 4 2 | 5 10 |
| 350 | 1 7 | 1 9 | 1 11 | 2 2 | 4 4 | 6 0 |
| 400 | 1 8 | 1 10 | 2 0 | 2 3 | 4 6 | 6 2 |
| 450 | 1 9 | 1 11 | 2 1 | 2 4 | 4 8 | 6 4 |
| 500 | 1 10 | 2 0 | 2 2 | 2 6 | 4 10 | 6 6 |
| 600 | 2 0 | 2 2 | 2 4 | 2 8 | 5 2 | 6 10 |
| 700 | 2 2 | 2 4 | 2 6 | 2 10 | 5 6 | 7 2 |
| ½ mile | 2 6 | 2 8 | 2 9 | 3 2 | 6 2 | 7 6 |
| 1,000 | 2 7 | 2 9 | 3 0 | 3 4 | 6 6 | 7 9 |
| 1,200 | 3 2 | 3 3 | 3 4 | 3 8 | 6 10 | 8 1 |
| 1,500 | 3 8 | 3 9 | 3 10 | 4 3 | 7 4 | 8 8 |
| 1 mile | 4 2 | 4 3 | 4 4 | 4 9 | 8 0 | 9 2 |
| 1¼ ,, | 4 8 | 4 10 | 5 0 | 5 7 | 8 9 | 10 0 |
| 1½ ,, | 5 4 | 5 6 | 5 8 | 6 4 | 9 6 | 10 10 |
| 1¾ ,, | 6 0 | 6 2 | 6 4 | 7 0 | 10 3 | 11 8 |
| 2 ,, | 6 10 | 7 0 | 7 2 | 7 8 | 11 0 | 12 6 |
| 2¼ ,, | 7 8 | 7 10 | 8 0 | 8 4 | 11 9 | 13 4 |

N.B.—The first two or three items to be removed by wheelbarrows. The whole is an open cutting, the shale and hard rock including explosives.

**The Average Weight of Sandstone** is about 15 cubic feet per ton in place, or 36cwt. per cubic yard, and as it increases about four-fifths in bulk in removal, a solid cubic yard will be about two single horse loads. In bluestone, granite, or marble it will be about two tons, or fully two loads.

**A barrow load** will be about two cubic feet.

## SURFACE WORK.

### PER SUPERFICIAL YARD, INCLUDING TOOLS, &c.

**Wages, 1s. per hour.**

| | s. | d. |
|---|---|---|
| Levelling made earth not more than one foot deep .. .. | 0 | 2 |
| Surface forming for roads not more than 9 inches deep, in earth, hard clay, &c. .. .. .. .. | 0 | 3 to 0 4 |
| Ditto do. in rock .. .. .. .. .. | 0 | 9 to 1 0 |
| Soiling slopes of embankments and cuttings .. .. | 0 | 4 to 0 6 |

## TURFING.

| | | |
|---|---|---|
| Turfing, removing, and re-laying grass turf .. .. | 1 | 0 to 1 5 |
| Getting and carting sods, 1 mile .. .. .. .. | 0 | 7 to 0 9 |

Ploughing up surface of ground at 20s. per acre, is equal to 1½d. per rod, or .05d. per sup. yard ; at 40s. per acre, equal to 3d. per rod, or ½d. per cubic yard.

## MEASUREMENT OF AN ACRE OF LAND.

### IN SQUARE ANGLE BLOCKS.

| Width | Length | Width | Length | Width | Length | Width | Length |
|---|---|---|---|---|---|---|---|
| Feet. | Feet. | Feet. | Feet. | Feet. | Feet. | Feet. | Feet. |
| 20 | 2,178 | 120 | 363 | 210 | 207 | 320 | 136 |
| 30 | 1,459 | 130 | 336 | 220 | 198 | 340 | 128 |
| 40 | 1,085 | 140 | 312 | 230 | 189 | 360 | 121 |
| 50 | 875 | 150 | 290 | 240 | 181 | 380 | 114 |
| 60 | 725 | 160 | 272 | 250 | 174 | 400 | 109 |
| 90 | 622 | 170 | 250 | 260 | 167 | 450 | 96 |
| 80 | 545 | 180 | 242 | 270 | 161 | 500 | 87 |
| 90 | 484 | 190 | 224 | 280 | 155 | 550 | 79 |
| 100 | 436 | 200 | 218 | 290 | 150 | 600 | 73 |

## SINKING TANKS, WELLS, OR SHAFTS.

**Per cubic yard, including tools, tackle, and powder.**

*Wages of Well-digger,* 1s. *per hour.*

| | s. | d. |
|---|---|---|
| Excavation for wells or small tanks or shafts, not more than 20 feet deep, light ground | 2 | 3 |
| Ditto in stiff clay or hard gravel | 3 | 6 |
| Ditto in sandstone, hard rock, or shale | 9 0 to 13 | 6 |
| Ditto in bluestone or other trap-rock | 18 0 to 27 | 0 |
| From 20 to 40 feet deep, add one-third. | | |
| From 40 to 70 feet deep, add two-thirds. | | |
| From 70 to 100 feet deep, reckon double. | | |
| Guttering in coal shale or soft shale, per super foot | 0 4 to 0 | 5 |
| Guttering in sandstone, per super. foot | 1 0 to 1 | 3 |
| Ditto in bluestone or granite, do. | 2 0 to 3 | 0 |

N.B.—In the third and fourth items, take the least price for the largest, and the greatest for the smallest wells, on account of the difficulty of working and blasting rock in confined areas.

If blasted with explosives, one side of the tank or well must be kept above the other, to give a face and render the blasts effective. See Quarrying.

**Guttering.**—In rock excavation, where any portion of sides are required to be left even or picked, a groove or gutter must be kept in advance of the main excavation to prevent injury to sides by blasting.

Gutterers, or Rock-choppers' wages, 9s. per day of 6 hours.

## MINING SHAFTS.

**Double Shaftsinking.**—Shaft 10 feet by 4 feet wide, timbered with 9 x 3 H.W., with two cage and one ladder compartments, each about 3ft. 6in. x 3 ft., with two 9 x 3 centres, the two centres and two ends to be let into grooves cut into the sides or wall plates, mitre fashion, so as not to weaken the timber. An opening of two inches is generally left at every fifth set, so as to get in a stage board for repairs. The centres fit close and ensure good ventilation, even for a shaft 2000 feet deep, giving an *upcast* and a *downcast* current.

The ladders are inclined with a stage and manhole, not more than 30 feet apart. *See Mines Act.* A shaft as above, with machinery, pumping gear, fuel, &c., will cost about £10 per foot in depth.

**Sinking Shaft,** 6 x 3, through trachyte (or the hardest rock at Hill End goldfields), three men averaged one foot per day for 120 feet deep. This, at 8s. per day, is 24s. per foot in depth, exclusive of cost of windlass, sharps, and explosives.

**Tanks.**—Unless there is a face or side obtained in sinking tanks or shafts in rocks, the explosive used will have little effect ; it is therefore usual to keep one side of the tank or hole at least two feet above the other, where practicable. This remark also applies to drives or tunnels. Where tanks or shafts are not lined it is usual to gutter or pick a smooth-faced channel over the whole surface of the sides ; but as this process is very expensive, it is not adopted where it can be avoided.

**Large open excavations in sandstone,** cost from 3s. to 5s. per cubic yard.

### TUNNELLING AND SHAFT SINKING.

*Per lineal foot (all found).*

| | |
|---|---|
| Drive 4 x 3 for sewer, Sydney sandstone | 12/– to 16/– |
| Drive 7 x 7 in Sydney sandstone | 20/– to 27/– |
| Drive 6 x 3 in hard, compact rock (trachyte) | 25/– to 30/– |
| Ditto in clay or soft shale | 10/– to 15/– |

## RAILWAY TUNNELS.

Railway Tunnel.—If the rock is self-supporting, after reckoning the cost of guttering both sides and top, the *core* may be removed at about double the cost of similar rock in open cutting, but when timbering is required for subsequent lining, the cost is uncertain.

| *Per cubic yard.* | Without guttering. | With guttering. |
|---|---|---|
| Tunnel, 20 x 15, sectional area 30 super. yards, curved all round through hard bluestone rock | 15/– | 24/– |
| Ditto, ditto, through granite, &c. | 21/– | 36/– |
| Ditto, through soft clay, slate, or shale | 10/6 | 18/9 |

**Confined space quarrying,** no explosives used :—Sinking circular tank in sandstone rock—10 feet 6in. diam. x 13 feet deep = 42½ cubic yards ; including scappling, sides and bottom :—One man, 500 hours at 1s. = £25 ; about 11/9 per cubic yard.

## MINING.

### Mining in Felsite (Burragorang).

| *Including Haulage and Explosives.* | Cost per foot deep. |
|---|---|
| Sinking shaft on underlay, 30 degrees incline, " Felsite," with horse-whip and ½-ton trucks, to 300 feet from surface, 9 x 6 ; good holding ground, " stull " posts only | 1 15 0 |
| Ditto, to 300 feet, vertical shaft, plain | 2 0 0 |
| Ditto, to 300 feet, with " stull " posts only | 2 5 0 |
| Ditto, to 400 feet, steam haulage, 12 x 6 shaft, close timbering | 2 10 0 |
| Prospecting Tunnel in Felsite, fall from face to outlet, 200 feet x 6 feet x 4 feet (trucks and rails found) 10/– to | 0 15 0 |
| Driving tunnel, 9 feet x 6 feet, fall from face to outlet, up to 300 feet, full cost | 1 5 0 |

**Tamping,** or filling up the holes to prevent the powder blowing out, is an important item in blasting rock. It has been found, after long experience, that dry clay is the best material, and broken bricks, moistened, the second best ; the depth of the tamping should also be at least equal to the depth of the powder, although I have known effective blasts with only one-third tamping. High explosives, like gelignite, strike downwards more than common powder, and does not require so much tamping, but it will be found that dry clay is best in all cases.

## PORTABLE RAILWAYS.

STEEL RAILS 10lbs. TO THE YARD, WITH CORRUGATED OR FLAT STEEL SLEEPERS.

*To carry Trucks or Cars up to 25 cwt. each.*

| | 18in. | | 24in. | | 30in. gauge | |
|---|---|---|---|---|---|---|
| | £ | s. | £ | s. | £ | s. |
| Straight Line, per mile .. .. | 280 | 0 | 290 | 0 | 300 | 0 |
| Curved Line, per yard .. .. | 0 | 4 | 0 | 5 | 0 | 5 |
| Two-way Switch and Crossing .. | 3 | 0 | 3 | 5 | 3 | 8 |
| Three-way .. .. .. .. | 6 | 0 | 6 | 10 | 6 | 15 |
| Turntable .. .. .. .. | 3 | 15 | 4 | 10 | 5 | 5 |
| With extra Sleepers for Locomotive Works .. .. .. .. | 300 | 0 | 320 | 0 | 330 | 0 |

WITH STEEL RAILS 14lbs. TO THE YARD.

*To carry Trucks or Cars up to 50 cwt. each.*

| | £ | s. | £ | s. | £ | s. |
|---|---|---|---|---|---|---|
| Straight Line, per mile .. .. | 340 | 0 | 350 | 0 | 360 | 0 |
| Curved Line, per yard .. .. | 6 | 0 | 0 | 6 | 0 | 6 |
| Two-way Switch and Crossing .. | 3 | 10 | 3 | 15 | 4 | 5 |
| Three-way .. .. .. .. | 7 | 0 | 7 | 10 | 8 | 0 |
| Turntable .. .. .. .. | 4 | 10 | 5 | 10 | 6 | 5 |
| With extra Sleepers for Locomotive Work .. .. .. .. | 365 | 0 | 383 | 0 | 395 | 0 |

WITH STEEL RAILS 18lbs. TO THE YARD.

| | 18in. | | 24in. | | 30in. gauge | |
|---|---|---|---|---|---|---|
| | £ | s. | £ | s. | £ | s. |
| Suitable for Locomotive Work .. | 450 | 0 | 460 | 0 | 475 | 0 |
| Curved Line, per yard .. .. | 0 | 7 | 0 | 8 | 0 | 8 |
| Two-way Switch .. .. .. | 6 | 0 | 6 | 0 | 6 | 10 |
| Three-way Switch .. .. .. | 11 | 0 | 11 | 10 | 12 | 0 |
| Turntable for 4-wheel Coupled Engline | 10 | 0 | 10 | 10 | 12 | 0 |
| Turntable for 6-wheel Coupled or Bogie Engine .. .. .. | 15 | 10 | 16 | 10 | 17 | 10 |

*Weighing Machines Supplied.* *Estimates on Application.*

The Railways can be sent away in parts if desired, with clips or chairs. Bolts have to be tightened or keys driven in, after which the railway is ready for laying down. Prices same as riveted railway. (*See above.*)

Railways with 25lb. steel rails and heavy channel sleepers for permanent way, 30in. or 36in. gauge, costs £550 per mile. Curves, 8s. 6d. per yard ; switches, £7 10s. each.

## TRUCKS AND WAGONS.

4-CENTRE IRON TIPPING WAGON.

| | | To carry. | |
|---|---|---|---|
| Capacity, 9 cubic feet | .. .. .. | 10 cwt. | £7 10 |
| 12 ,, ,, | .. .. .. | 12 ,, | 9 0 |
| 20 ,, ,, | .. .. .. | 20 ,, | 11 5 |
| 30 ,, ,, | .. .. .. | 35 ,, | 15 10 |
| 40 ,, ,, | .. .. .. | 45 ,, | 20 0 |

*Tipping at sides or ends, as required.*

4-CENTRE ALL-ROUND TIPPING WAGON.

| | | To carry | |
|---|---|---|---|
| Capacity, 9 cubic feet | .. .. .. | 10 cwt. | £9 0 |
| 12 ,, ,, | .. .. .. | 12 ,, | 10 5 |
| 20 ,, ,, | .. .. .. | 20 ,, | 13 0 |
| 30 ,, ,, | .. .. .. | 35 ,, | 17 10 |

*Tipping at sides or ends at pleasure.*

PLAIN IRON WAGON.

*With sides to let down, for Coke, Earth, or other light material.*

| | | To carry | |
|---|---|---|---|
| Capacity 12 cubic feet | .. .. .. | 10 cwt. | £8 0 |
| 20 ,, ,, | .. .. .. | 20 ,, | 10 0 |
| 30 ,, ,, | .. .. .. | 35 ,, | 14 5 |
| 40 ,, ,, | .. .. .. | 45 ,, | 18 0 |
| 60 ,, ,, | .. .. .. | 65 ,, | 24 0 |
| 80 ,, ,, | .. .. .. | 90 ,, | 30 0 |

BOGIE WAGONS.

| On Eight Wheels. | | To carry | |
|---|---|---|---|
| Length, 10 feet | .. .. .. | 2½ tons | £17 10 |
| 12 ,, | .. .. .. | 3 ,, | 20 0 |
| 14 ,, | .. .. .. | 4 ,, | 25 0 |
| 16 ,, | .. .. .. | 5 ,, | 30 0 |

## PLOUGHS AND SCOOPS.

3-WHEEL SCOOPS.—Are great labour-savers for hauls not exceeding 5 chains. Said to be 20 per cent. cheaper than tip carts for removing spoil. Cost from, 9 cubic ft., £15 ; 24 cubic ft., £21 each.

Heavy Road and Tank-making Ploughs, from £15.

Drag Scoops for short hauls.—Improved Skid Scoops, 2ft. wide, £8 ; to 4ft., £14 ; with bars or chains.

Little Giant Wheel Scraper, on two Sarven wheels, 31in. diameter, £14/7/6. This scoop lifts clear of ground. For rough tracks ; for pair of horses.

" Columbus " Solid Steel Drag Scraper, 7 cubic ft., £3 ; 5 cubic. ft., £2/15/– ; and 3½ cubic ft., £2/10/–.

### STEAM SHOVEL OR "NAVVY."

In a railway cutting, Grenock, Scotland, marl and rock, 20ft. high by 35 ft. wide, assisted by blasting, from 300 to 400 cubic yards was removed per 10 hours, at a cost of 4d. per cubic yard (not including blasting). Previously it cost the contractor 3s. 6d. per cubic yard.

Another comparison.—At Newcastle-on-Tyne, 1904, P. T. Messent, Railway Contractor, working in heavy clayey soil, states the cost of putting clay on wagons was 3d. per cubic yard, against 5½d. by hand previously.

C. J. Wills, Contractor, Manchester Ship Canal, states he had 16 machines at work, and had shifted as much as 1100 cubic yards per day of 10 hours, with one machine, in strong material, the cost of working navvy being 56/– wages, ½-ton coal, 5/–, 670 gals. water, 2/– ; total, £3/3/– per day.

With the help of a little explosive the navvy shifted the soft English red sandstone very readily, averaging 800 cubic yards per 10 hours.

A steam shovel has been installed for alluvial gold dredging at Araluen, N.S.W.

It is also a useful machine for clay and shale pits.

Prices of Steam "Navvys" range from £950 to £1500, delivered to Australian ports, including freight, duty, &c.

| No. | Tons. | Total Weight Tons. | Size of Bucket. | Output per Day—Tons. |
|---|---|---|---|---|
| 10 | 12 | 36¼ | 1¾ or 2¼ | 1400 |
| 8 | 10 | 28½ | 1 c. yd. | 900 |
| 6 | 8 | 26½ | ¾ | 700 |

Agents for English make—Gibson, Battle & Co.

## MACHINE EXCAVATORS.

The railroad across the black soil plains, from Narrabri, *via* Moree, to Inverell, was accelerated by the use of Champion's Road Grader, made by Carrolin, of Ballarat, which machine ploughed and loosened the soil at sides of road ; thence on to a long revolving belt stretched on outrigger frame, which deposited the loosened soil to the will of driver ; said to be at about 30 per cent less than dobbin-cart work in similar soil. Cost price, according to capacity, on application.

### ROAD GRADERS.

The Austin Road Grader, made by Booth, Macdonald & Co., Ltd., Christchurch, N.Z. ; J. Martin & Co., agents, Sydney ; is a 4-horse abreast machine that is said to grade a road to any desired contour, and throw the spoil either way Two men required to work machine. The blade can be set at any pitch and at any angle, and can be made to throw spoil out either side, or work close up to footpaths and boundaries. This grader is also employed for making tracks, cutting drains, grading irrigation paddocks, making shallow storm-water channels, irrigating and draining on any extensive scale. Probable saving of cost from 30 to 50 per cent. in road grading on old methods employed. Cost—£100, delivered Sydney.

## DREDGING.

### Excavating by Ladder Dredge.

HARBOURS AND RIVERS.

*Government Works Department Report*, 1905.

| | Per ton. |
|---|---|
| 300 days run of 8 hours. "Newcastle" dredge, sand to 26ft. level, and discharging at sea, 10 miles, cost .. .. | 3.16d. |
| At Newcastle, per dredge "Glaucus," sand to 26ft. level, 394,440 tons, dredging alone .. .. .. .. | 1½d. |
| Including discharging at sea .. .. .. .. | 2¼d. |

Sand on rough rock bottom, costing from 9d. to 1/– per ton.

### SUCTION PUMP DREDGING.

| | |
|---|---|
| Suction Pump Dredge at Byron Bay, sand and shingle .. | 4.26d. |
| Suction Pump Dredge, "Jupiter," sand, mud and shingle, 128,331 tons sand, clay, shell, mud and stone .. .. | 4.11d. |

Alluvial dredging, Araluen G. D. Co., from two ladder dredge :— old river bed,

20 ft. above and 25ft. below water, average 55,000 c. yards, cost £80 ;

18 ft. above and 28ft. below water, average 11,000 c. yards, cost £80.

¾d. to 1¾d. per c. yard.

The cost of dredging and towing out to sea five miles, varies from 3d. to 10d. per ton, according to material excavated.

The Government Dredges may be hired from the Sydney Harbour Trust, with their accompanying punts and tugs, at the following rates, per day of 8 hours :—

| | |
|---|---|
| For Ladder Dredges .. .. .. .. | £20 to £30 |
| For Grab Dredges .. .. .. .. | £5 to £7 |

### CRAB DREDGES.

PRIESTMAN BROS.' grab is a very effective excavating machine. It is, in appearance, like a steam crane, but is also specially designed for passing under low bridges, through narrow canal locks, &c.

*Cost of working.*—The Sydney Harbour Board has dredged heavy silt at 1¾d. per ton, which used to cost 5d. per ton when raised by the large Steam Ladder Dredger, and another Harbour Board has done for 3d., dredging which used to cost 8d. per ton, and, they state, with more hopper accommodation, their work could be done for 1½d. per ton. A railway contractor who was paying 6d. for excavating bridge foundations, subsequently did the same for less than 2d. with one of the above machines.

**Approximate Quantities** of material these machines will discharge per day of 10 working hours—average height of lift 20 feet from ground level—worked by *one man only*—

| Size of Crane. | When using the Buckets. | | When using the Grabs. | Approx. Price without barge. |
|---|---|---|---|---|
| | Mud in Dredging. | Small Coal, Sand, &c. | Excavating Clay, &c. | |
| Z cwts. 2½ | 100 Tons | Tons. | Tons. | £330 |
| Y ,, 5 | 175 ,, | | | |
| A ,, 10 | 250 ,, | 200 ,, | 150 ,, | |
| B ,, 20 | 500 ,, | 400 ,, | 300 ,, | £600 |
| C ,, 30 | 650 ,, | 550 ,, | 400 ,, | |
| D ,, 40 | 800 ,, | 700 ,, | 500 ,, | £880 |

The size of the Barge required for carrying the Dredgers depends on the number it has to carry.

For working in canals, narrow rivers, &c., Barges of very small beam can be employed by using loose side timbers, which may be disconnected when necessary.

## FRACTIONS AND THEIR DECIMAL EQUIVALENTS.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1/64 | 0.0156 | 17/64 | 0.2656 | 33/64 | 0.5156 | 49/64 | 0.7656 |
| 1/32 | 0.03125 | 9/32 | 0.28125 | 17/32 | 0.53125 | 25/32 | 0.78125 |
| 3/64 | 0.0468 | 19/64 | 0.2968 | 35/64 | 0.5468 | 51/64 | 0.7968 |
| 1/16 | 0.0625 | 5/16 | 0.3125 | 9/16 | 0.5625 | 13/16 | 0.8125 |
| 5/64 | 0.0781 | 21/64 | 0.3281 | 37/64 | 0.5781 | 53/64 | 0.8281 |
| 5/32 | 0.09375 | 11/32 | 0.34375 | 19/32 | 0.59375 | 27/32 | 0.84375 |
| 7/64 | 0.1093 | 23/64 | 0.3593 | 39/64 | 0.6093 | 55/64 | 0.8593 |
| 1/8 | 0.125 | 3/8 | 0.375 | 5/8 | 0.625 | 7/8 | 0.875 |
| 9/64 | 0.1406 | 25/64 | 0.3906 | 41/64 | 0.6406 | 57/64 | 0.8906 |
| 9/32 | 0.15625 | 13/32 | 0.40625 | 21/32 | 0.65625 | 29/32 | 0.90625 |
| 11/64 | 0.1718 | 27/64 | 0.4218 | 43/64 | 0.6718 | 59/64 | 0.9218 |
| 3/16 | 0.1875 | 7/16 | 0.4375 | 11/16 | 0.6875 | 15/16 | 0.9375 |
| 13/64 | 0.2031 | 29/64 | 0.4531 | 45/64 | 0.7031 | 61/64 | 0.9531 |
| 7/32 | 0.21875 | 15/32 | 0.46875 | 23/32 | 0.71875 | 31/32 | 0.96875 |
| 15/64 | 0.2343 | 31/64 | 0.4843 | 47/64 | 0.7343 | 63/64 | 0.9843 |
| 1/4 | 0.25 | 1/2 | 0.5 | 3/4 | 0.75 | 1 | 1.0 |

# DRAINER.

**Glazed Earthenware Pipe Drains** are measured at per foot run.

To include digging and filling in trenches at 3/– per cubic yard, to average depth of 3 feet.

Labour laying to include jointing in cement, 3 to 1.

Labour, 1/– per hour.

LAID COMPLETE PER FOOT RUN.

| Internal Dia. inches. | Lin. feet per ton. | Cost of Pipe. | Excavation. | Laying & Jointing. | Total Cost. |
|---|---|---|---|---|---|
| | | s. d. | s. d. | s. d. | s. d. |
| 3 | 280 | 0 3½ | 0 3 | 0 2 | 0 8½ |
| 4 | 200 | 0 4 | 0 3 | 0 2 | 0 9 |
| 6 | 106 | 0 6 | 0 4 | 0 3 | 1 1 |
| 9 | 64 | 0 10 | 0 5 | 0 4 | 1 7 |
| 12 | 48 | 1 3 | 0 6 | 0 6 | 2 3 |
| 15 | 36 | 2 0 | 0 7 | 0 8 | 3 3 |
| 16 | 32 | 2 6 | 0 7 | 0 10 | 3 11 |
| 18 | 24 | 3 6 | 0 8 | 1 0 | 5 2 |
| 21 | 18 | 5 0 | 0 10 | 1 4 | 7 2 |
| 24 | 15 | 7 0 | 1 0 | 1 9 | 9 9 |

FLAP TRAPS.

| | | | | |
|---|---|---|---|---|
| 6inch Flap Traps, each | 17 6 | 0 4 | 1 0 | 18 10 |
| 9 inch Flap Traps .. | 21 0 | 0 6 | 1 3 | 22 9 |
| 12 inch Flap Traps .. | 27 6 | 0 6 | 1 6 | 30 5 |

The pipes and junctions average 2 feet long, bends and elbows about 18 inches long.

Single junctions, sloping or square, tapered pipes, bends or elbows, 50 per cent. extra.

Double junctions, 100 per cent., or double the price.

Drain Pipes laid in sandstone, concrete, reckon double prices for 4in. and 6in. pipes.

12in. Brick Surface Drains, bedded in sand and grouted in cement, 1/– per foot run.

**Brick on edge** against wall for asphalt drainage. 4d. per foot run.

**Cutting for drains** through sandstone rock, for pipes, add extra on above Table :—4in. G.E. pipes, 7d. ; 6in., 11d. ; 9in., 1/2 ; 12in., 1/5 per foot run.

**Excavation.**—This item is reckoned 3 feet deep by required width, including filling and ramming over pipes at 3/– per cubic yard. The cost of any other depth up to about 7 feet may be seen from this : if at the same price per cubic yard, 5 feet deep will be about double, and 7 feet deep about treble the price, on account of extra width at top required to lay the pipes.

## MATERIALS.

The cost of the pipes delivered in the cities. Reckon :—

**For Perforated Pipes** 10 per cent. more than ordinary.

**Channel or Half-pipes,** same as ordinary.

Channel 4in. U Tiles, flat bottom, 12in. long, per 100, 33/–.

### TRAPS.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4in. | Buchan Traps | 7 | 6 | P Traps | .. | 3 | 6 | Syphon Trap, | | 4 | 6 |
| 6in. | ,, | .. 12 | 6 | ,, | .. | 5 | 6 | 3ft. long | | 6 | 0 |
| 9in. | ,, | .. 30 | 0 | ,, | .. | 16 | 0 | ,, | | 30 | 0 |
| 12in. | ,, | .. 70 | 0 | Add for gratings, 5/– ; excavations and setting, 2/6 each. | | | | | | | |

| | | | |
|---|---|---|---|
| Gully Trap, 6in. inlet, 4in. outlet, including G.E. grating | .. | 4 | 6 |
| Round or Square Gully Traps, 10in. (Plain) | .. .. .. | 6 | 0 |
| Ditto, with one, two, or three inlets | .. .. 6/6 to | 8 | 6 |
| Gullies, 6in., 4/– ; 8in., 4/6 ; 10in., 6/– ; | .. .. 12in. | 6 | 0 |
| Gratings, 6in. and 8in., 6d. ; 10in., 1/– ; | .. .. 12in. | 1 | 6 |
| Gully Traps (New Pattern), 6in., 6/– ; | .. .. 10in. | 10 | 0 |

| | | | |
|---|---|---|---|
| Round or Square Sink Basin, 20in. x 20in. x 6in. deep | .. | 6 | 6 |
| Round do. do. 16in. x 16in. ; 18in. x 18in. x 6in. deep | | 5 | 0 |
| Ditto do. 24in. x 24in. x 5in. deep | .. .. .. | 8 | 0 |
| Ditto do. 22in. x 22in. x 5in. deep | .. .. .. | 7 | 0 |
| Round Grease Trap, 16in., with partitions | .. .. .. | 1 15 | 0 |
| Oblong Grease Trap, 23in. x 16in. x 17in. deep | .. .. | 2 10 | 0 |
| Closet Riser, 16½in. x 16½in. | .. .. .. .. .. | 17 | 6 |
| Inspection Pipe, 4in., 3/– ; 6in., | .. .. .. .. | 4 | 6 |
| Inspection Boxes, Iron | .. .. .. .. .. .. | 2 | 0 |
| Gratings, Iron | .. .. .. .. .. .. .. | 1 | 0 |
| Large Iron Gratings | .. .. .. .. .. .. | 5 | 0 |

**For Brick Sewers, Culverts, Well-holes, &c.**—Refer Bricklaying.

**Agricultural Drain Pipes.**

| Size. | Weight per 1000. | | Price per 1000. | | |
|---|---|---|---|---|---|
| Inches. | Tons. | Cwt. | £ | s. | d. |
| 1½ .. | 1 | 0 | 2 | 0 | 0 |
| 2 .. | 1 | 9 | 3 | 0 | 0 |
| 3 .. | 2 | 5 | 5 | 0 | 0 |
| 4 .. | 3 | 5 | 7 | 10 | 0 |
| 5 .. | 3 | 10 | 10 | 0 | 0 |
| 6 .. | 6 | 0 | 12 | 10 | 0 |
| 9 .. | 10 | 0 | 18 | 10 | 0 |

PRICE LIST

## MONIER PIPES.

For Drainage, Sewerage, Culverts, &c.

Manufactured by Gummow, Forrest & Co.

*Nett Prices.*—Delivered Rail, wharf, or five miles from factory, Alexandria. Classed " B " rates, 5-ton lots, N.S.W. Ry.
3ft. 7in. long, per Lineal Foot.

CIRCULAR PIPES—*Stocked Sizes.*

| Approximate Weight per Lineal Foot. | | | Inside Diam. | | Cost of Laying and Jointing per Lineal Foot. | |
|---|---|---|---|---|---|---|
| Cwt. | Qrs. | Lbs. | Ft. | In. | s. | d. | s. | d. |
| 0 | 3 | 2 | 1 | 6 .. .. .. | 3 | 0 | 0 | 5 |
| 1 | 0 | 1 | 1 | 9 .. .. .. | 4 | 9 | 0 | 6 |
| 1 | 0 | 27 | 2 | 0 .. .. .. | 6 | 6 | 0 | 6 |
| 1 | 2 | 25 | 2 | 6 .. .. .. | 9 | 0 | 0 | 8 |
| 2 | 0 | 24 | 3 | 0 .. .. .. | 11 | 9 | 0 | 10 |
| 2 | 3 | 12 | 3 | 6 .. .. .. | 14 | 9 | 1 | 0 |
| | | | | *Made to Order.* | | | | |
| 3 | 2 | 6 | 4 | 0 .. .. .. | 17 | 9 | 1 | 3 |
| 4 | 0 | 24 | 4 | 6 .. .. .. | 21 | 0 | 1 | 6 |
| 4 | 3 | 20 | 5 | 0 .. .. .. | 26 | 3 | 1 | 9 |
| 6 | 0 | 6 | 5 | 6 .. .. .. | 29 | 9 | 2 | 0 |
| 6 | 3 | 11 | 6 | 0 .. .. .. | 34 | 9 | 2 | 3 |

Junction Pipes made to order, 25 per cent extra.

| Cwt. qrs. lbs. | OVIFORM PIPES. Inside dia. Ft. In. Ft. In. | Cost of laying and jointing per lin. foot. s. d. | s. d. |
|---|---|---|---|
| 0 3 26 | 1 9 x 1 4, 3ft. 7in. long | 4 6 | 0 5 |
| 1 0 0 | 2 1 x 1 6½, 3ft. 7in. long | 6 0 | 0 6 |
| 1 2 0 | 2 5 x 1 9, 3ft. 2in long .. | 7 9 | 0 7 |
| 1 3 7 | 2 9 x 1 11½, 3ft. 7in. long | 9 3 | 0 8 |
| 2 0 13 | 3 3 x 2 2, 3ft. 7in long .. | 11 3 | 0 10 |

Prices include the supply of sufficient Joint-Netting and Scrim.

Short Lengths (1ft. 9in.) for Fitting, Curves, &c., Stocked.
Lamphole Covers, 2 6 x 1 9 x 3in. thick, with 9in. opening, 4/- each at Factory.
Manhole Covers, 2 7 diam., with ringbolt, 7/6 each.
Other Covers, 1 6 x 1 6 x 3in., 2/1 each.
Particulars and Sketches shewing method of Laying and Jointing forwarded on application.

## KIELBERG DRAIN PIPES.

*Australian Patents held by Richard Taylor, 31 Queen Street, Melbourne.*

These pipes can be manufactured in large quantities on site, thereby saving cartage to outlying districts, which would be considerable on stoneware pipes. Kielberg's Patent Cement-Concrete Pipes, are manufactured by machinery under pressure, and give excellent results in practice. At an age of two months they will stand a crushing strain of over three tons, and for internal water pressure they have proved watertight up to a pressure of five atmospheres, equal to a water pressure of 170 feet. They are made with sockets, and are about the same weight as stoneware, and for the larger sizes they are more economical. Being absolutely true in the bore, the sewers and drains are kept free from the obstructions which usually occur through materials being caught by the imperfections of joints.

The prices of manufacture of concrete pipes vary according to local conditions, but for estimating purposes tested pipes will cost as follows per foot run :—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4in. diameter .. | 0 4 | 12in. diameter | 1 1 | 18in. diameter | 3 0 |
| 6in. ,, .. | 0 6 | 15in. ,, | 1 9 | 24in. ,, .. | 5 0 |
| 9in. ,, .. | 0 9 | | | | |

## EXCAVATION TIMBERING.

**Timbering to open drains,** 8ft. deep x 2ft. 6in. wide, repeated use of timber. Add 9d. to 1/1 per cubic yard on excavation.

Close walling and staying trenches, rough planking and labour, both sides, 2ft. 6in. x 5feet deep, 9d. per foot run ; 2ft. 6in. x 8ft. deep, 1/- per foot run. Over 2ft. 6in., up to 4ft. wide, add quarter more for strutting. Galvanised corrugated iron sheets, with cross rails, preferred in some instances. If timbering is used in made ground, reckon for pointing boards, driving and staying, from 1/9 to 2/3 per yard super. For centering.—See CARPENTER.

## EXCAVATED DRAIN TRENCH.

Actual cost of work done.

*Example of cost* of excavating Drain Trench, 6 x 1ft. 6in., 4ft. sandstone, 2ft. soil, employing choppers at 9/– per day of 6 hours ; blacksmith and boy for sharps ; compressed pellet blasting powder, used estimated quantity 166 cubic yards, cost £32/14/–, or 4/– per cubic yard.

# SUNDRIES.

## ASPHALT WATER PIPES.

**Patent Steel Re-inforced Asphalt Water Pipes,** made all sizes, from 3in. to 18in. diameter, and for light or heavy pressure of water ; in 9ft. lengths, with patent clip collars. The advantages claimed—Acid and alkali proof, non-corrosive and rust proof. Half the weight of cast iron, and two-thirds the cost. For further particulars apply, Patent Asphaltum Co., N.S.W.

**Bitumen Pipe Joints.** G.E. Sewerage Pipes, Melbourne City Council, have in some instances been jointed with coal tar, bitumen, and blue stone dust mixture, sold in blocks at £7 per ton, by the Neuchatel Asphalt Co. 10lb. brick will do two joints of a 9in. pipe.

## ARTESIAN SURFACE WATER DISTRIBUTING DRAINS.

*N.S.W. Government Works Report, June,* 1905.

Distributing earth drains, to carry bore water from Artesian Wells at Coonamble, Walgett and Moree, mostly black, sticky soil, or red soil of the Plains. Total cost, including equipment, from £6/10/– to £12/15/– per mile, or 1½d. to 4d. per cubic yard, the drains containing about half a cubic yard for every running yard.

**Double-sided Plough Drain Maker** (Higgin's Patent).—Makes drains 54 x 16, at the rate of 4 or 5 miles per day, or varying widths and depths as required. *Labour required.*—One teamster and lad as offsider ; 20 horses. Team guides machine. *Construction.*—Very strong and "Fool-proof." Raising and lowering gear regulates depth or lifts clear for transport. Drains can be cleared at the rate of 10 miles per day. £40 to £75.

## CLEARING ROADS OR DRAINS

(Through Ti-Tree Scrubs).

**Scrub-Cutting Roller,** drawn by bullocks walking on fallen scrub. Worked with side draught. 10ft. roller, with knives, cuts about 8 acres per day, according to thickness of scrub and size of block. Saves about 25/– per acre. Scrub is cut twice and burns up clean ready for ploughing. Ti-tree sticks up to 4 inches in diameter can be smashed down and cut. Rollers made in sizes to suit. Prices and particulars on application. From £8. Meadow Bank Works, Sydney.

# EXPLOSIVES.

## BLASTING AND EXPLOSIVES.

The present low price of explosives quoted is due to strained competition, and may at any time vary.

For sandstone quarrying, where the mass of rock is not to be shattered, the slower explosive action of blasting powder is preferable.

In large blasts, chambering for the concentrated charge of the powder is made by simply exploding a cartridge or two of Gelignite at bottom of drill hole, and clearing out debris previous to charging. *See* under " QUARRYING," for blasting powder required.

BLASTING POWDER at Stawell, Victoria, made by the Consolidated Mining Co. at a cost of about 6d. per b., and is of the same strength as ordinary blasting powder.

COMPRESSED BLASTING POWDER.—This is now much used in sewer work. It is made at Sandhurst, compressed by powerful hydraulic presses into Pellets 1in., 1⅛in., 1¼in., and 1⅜in. diam., by about 2½in. long, with a hole through the centre for the fuse. The advantages are said to be :—

1. A greater amount of powder in a smaller space, and consequently a smaller bore hole is required.
2. Where rock drills are used, and a great number of holes have to be charged, sometimes among fumes, it is much quicker done.
3. They are cleaner for charging as no loose powder remains in crevices, causing waste and danger in tamping. 7½d. per lb.

PERMITTED EXPLOSIVES, for use in Coal and fiery mines :—
Bobbinite Pellets, no detonator required, 7d. per lb.
Brillonite, Carbonite, Fracturite, Saxonite, for hard headings.
Monoble and Colliery Cheddite are high explosives.
Curtis & Harvey's Dragonite, for ironstone, granite and slate quarries.

CHEDDITE is a patent explosive, introduced into England by Curtis & Harvey in 1902. Awarded 6 medals—Athens, 1903 ; St. Louis, 1904 ; Liege (Gold Medal), 1905. It contains no nitro-glycerine or hygroscopic substances, is unaffected by exposure or temperature. Similar to gunpowder in spreading action, with more energy. Delivers the rock in sound condition for structural work. Conveyed under the same regulation of package as gunpowder ; will not explode by spark or ordinary flame. Supplied in cartridges or loosely like gunpowder. Price, 9d. per lb.

**SOME TEST RESULTS FIRED RECENTLY are as follows :—**

LIMESTONE quarry at Abbotsleigh.—A hole was bored 4¼ feet deep and charged with 3lbs. 5¼ozs. of Cheddite. Block removed measured 26 feet, 9½ feet transversely and 5 feet deep — to 91½ tons ; or 27 tons of rock obtained per pound of explosive.

At the stratified FLINT quarries, Wick, near Bristol, the rock is nearly pure Silica, and extremely hard, a 1½in. cube resisted breaking up to a crushing force of 20.35 tons. A shot was fired here on July 9th, 1902, in a hole 2 feet deep, on a bed 2½ feet thick, with 5¾ozs. of Cheddite, which broke out 27 square feet of the bed, yielding over 6 tons—or 18 tons of flint per pound.

Other published results in CARBONIFEROUS LIMESTONE of Buxton, Eng., 1905, give 15.75 tons average per lb. of explosive. Sydney Agent—Scott, Henderson & Co.

## HIGH EXPLOSIVES.

**Gelatine explosives**, by reason of their plasticity and greater power and water-resisting qualities, are more suitable and economical than Dynamite, and can be recommended for all ordinary rock-blasting purposes, pit-sinking, tunnelling, quarrying, metalliferous mining, limestone blasting, submarine blasting, etc., and are unaffected by water.

No. 1 DYNAMITE is a reddish-brown moist powder, consisting of 75 per cent. of Nitro-Glycerine, absorbed in 25 per cent. of Kieselguhr. As Dynamite parts with its Nitro-Glycerine if left for a time in contact with water, it should in all cases be kept perfectly dry until used. 58 cartridges to 5lb. packet. 10d. per lb.

BLASTING GELATINE is yellowish in colour, semi-transparent, and elastic to the touch. It is composed of 93 per cent. of Nitro-Glycerine and 7 per cent. of Soluble Gun-cotton. It is 50 per cent. stronger than No. 1 Dynamite. It is specially suited for submarine blasting, tunnelling and sinking, and where hard rock is to be removed. It is the safest, and at the same time one of the most powerful of Explosives. 52 cartridges to 5lb. packet. 1/2 per lb.

GELATINE-DYNAMITE is an opaque plastic compound consisting of 80 per cent. Nitro-Glycerine and Nitro-Cotton, and 20 per cent. Nitrate of Potash and Wood Meal. It is 30 per cent. stronger than No. 1 Dynamite, but being slower in action it has a less shattering effect than No. 1 Dynamite, and is specially suitable where the rock is required to be removed in as large masses as possible. 1/– per lb.

GELIGNITE, which is the same price as No. 1 Dynamite, is an Oralate of Ammonia Compound, or a variety of Gelatine-Dynamite, being 12 per cent. stronger than No. 1 Dynamite, but for all round work Gelignite is specially recommended. It is suitable for all kinds of mining and engineering operations where a milder explosive than B.G. or G.D. can be used. 10d. per lb.

RACKAROCK PATENT BLASTING COMPOUND is composed of two ingredients, the *cartridges* and *the liquid*, which are not explosive while separate. When required for use dip the cartridges in the liquid for a *few seconds* and then treat them as Dynamite. It may be stored or forwarded by land or water the same as ordinary goods and at the same rates. It does not cause headache even when used in close workings.

RACKAROCK, is sold by the lb. (the present price is 1/7½ per lb.) in parcels of 50lbs. and upwards. The proportion of solid to liquid is 4 to 1, therefore a parcel of 50lbs. would consist of 40lbs. cartridges and 10lbs. liquid. No. 6 detonators only should be used. It is slower in its action than Dynamite, and more like common blasting powder in this respect. Made in seven sizes, from ¾in. to 2½in. diameter. 8d. per lb. R. A. Hervey, Clarence-street, Sydney ; N. Guthridge, Melbourne, are the agents.

ROBURITE.—Roburite is four times as powerful as Hall's blasting powder, and is equal or superior to the best dynamite. Experiments were made at the Burwood Extended Colliery Co., N.S. Wales, with Roburite, which were highly satisfactory, and were pronounced by Mr. Ridley, the underground foreman, to be superior to the effect produced by dynamite. The company have a factory at Eastwood, near Sydney.

## ELECTRIC SHOT FIRING

is now recognised as a much cheaper and safer method of shot firing as compared with ordinary safety fuse, and better results are obtained in removing rock from extensive face when a number of shots are fired simultaneously.

**Firing by electricity.**—In firing holes, a complete circuit must be made with the insulated wire, and wherever the wires are joined, the surfaces must be scraped clean with a pocket knife. The battery must be connected by the man that charges the holes, after he has been wound up the shaft, and if any holes misfire, the battery must be disconnected by him before descending the shaft.

For the guidance of intending users of electrical blasting, the following is a specification of the necessary appliances :—

**An Exploder (Battery).**

**100 yds. Main Cable,** double wire, 3/9 per lb.

**100 yds. I.R. Covered Wire,** to be used in short lengths from shot-hole to shot-hole, as connecting wire. 2/9 per lb.

Explosives, 6d. to 1/2 per lb.

Electric No. 6 Detonator Fuses, fitted with connecting wires, 4ft. long, 10/– per 100 ft. ; 4ft. 6in. long, 12/– ; 5 ft. long, 14/– ; 6 feet long, 18/– ; 8 feet long, 21/– ; 10 feet long, 26/– ; 12 feet long, 30/– per 100.

## SPECIALITIES.

**A Testing Set or Galvanometer,** for testing Low Tension Fuses, before firing, £3 to £5.

**One Pound Chatterton's Compound.**

**Two Coils Rubber Taping.**

**Gutta Percha Fuse** and **Countered Gutta Percha,** for blasting in water or very wet ground.

**Colliery Fuse** for fiery and dusty mines.

**Bruguet's Magnetic Exploder.**—This machine is contained in a small mahogany box, weighing 20lbs., price about £8 ; firing 8 holes simultaneously. I have tried it with two 4-inch holes, containing 66 and 34lbs. of blasting powder, and found it most simple and effective 80 yards from charge, removing about 900 tons of Sydney freestone. I

have also fired, with the same machine, four of Able's Exploders simultaneously, the twin cable to holes being 30 yards only, and the three wires joining the four charges, about 11 yards each.

**Rand's Battery** is similar. At Sandhurst, 14 holes have been fired at once with this machine.

Various kinds of Exploders are made, small and portable, and about 20lbs. each.

**Siemen's Exploder,** capacity 10 holes, £4/5/–

**Rackbar,** ditto, capacity 20 holes, £8.

All directions for charging, arrangement and testing of wires, and firing with above, are printed and accompany machines, and should be followed minutely to detail, to save accident and ensure success.

## BLASTING.

**Blasting.**—One lb. of the best blasting powder will remove from three to six perches of sandstone, or from three to six tons of bluestone, granite, &c., if used in the usual way ; the powder is most effective if the line of resistance (the distance from the hole to the face of the rock) does not exceed one-half the depth of the hole, the ends being open or free.

## COST OF DRILLING BY HAND JUMPER.

**Blasting Powder** required for different sized holes, &c. :—

| Diam. of Hole. Inches. | Powder in 1 foot. Lbs. | Depth for 1 lb. Powder. Feet dec. | Cost of Drilling, &c., per foot by Hand Jumper. Shale. | Sandstone. | Bluestone. |
|---|---|---|---|---|---|
| | | | s. d. | s. d. | s. d. |
| 1½ | 0.71 | 1.41 | 0 6 | 0 8 | 1 4 |
| 2 | 1.26 | 0.80 | 0 7 | 0 10 | 1 8 |
| 2½ | 1.98 | 0.51 | 0 8 | 1 0 | 2 0 |
| 3 | 2.83 | 0.35 | 0 10 | 1 3 | 2 6 |
| 3½ | 3.85 | 0.26 | 1 0 | 1 6 | 3 0 |
| 4 | 5.03 | 0.20 | 1 2 | 1 9 | 3 6 |
| 4½ | 6.36 | 0.16 | 1 4 | 2 0 | 4 0 |
| 5 | 7.86 | 0.13 | 2 0 | 3 0 | 6 0 |
| 6 | 11.31 | 0.09 | 3 0 | 4 6 | 9 0 |

The last column includes labour, sharpening jumper, and fuse in charging and tamping per foot for the first six feet ; for the next 10 feet add one-half per foot, and from 16 to 26 feet double. For the first 6 feet, one man can manage the drill ; from 6 to 16 feet, two men, and from 16 to 26 feet, three men are required. If only one size of drill is used — say four inches in diameter, it will wear away to 3½ inches before it is down 20 feet, even in the soft freestone of the coal measures, as at Sydney and suburbs.

The hardness of sandstone varies even in the same quarry, but the above table is for the average yellow block Pyrmont stone. In surface sewer excavation, I have known a 5 feet hole x 1½in. diameter at surface drilled with hand jumper in 30 minutes, with only three sharps. At 30 feet under surface the same sized hole took two hours, with 10 sharps. A careful personal inspection and trial holes on site are necessary for safe tendering.

# QUARRYING.

**In quarrying** it is always considered advisable to obtain a vertical face to the quarry, the higher the better ; if the stone is detached at the ends with a natural cleavage, parallel with the face of the quarry, you will then be able to obtain an immense quantity of stone with a single hole. A block of freestone was detached from the face of a quarry at Sydney, about 150 feet long by 35 feet wide and 46 feet deep. A 5-inch hole was bored in the line of cleavage, about 75 feet from each end of the quarry, and 35 feet from its face, to the bed of the quarry 46 feet in depth, into which was inserted 200 lbs. of blasting powder, filling up the lower 26 feet of the hole, the upper 20 feet tamped with dry clay. The mass, weighing about 15,000 tons was moved forward about 18 inches, ready to be wedged and split up into blocks suitable for building. This hole was fired in three places by electricity, removing 75 tons of freestone for every lb. of powder exploded. By Sir F. Burgoyne's formalæ for limestone. this would have required

$$35^3 = \frac{42{,}875}{32} = 1340\text{lbs.} \left\{ \begin{array}{c} \text{the quantity actually used was nearer} \end{array} \right\} 35\tfrac{1}{2} = \frac{1225}{6} = 204\text{lbs.}$$

**In opening a quarry** there is always a loss of labour in removing surface soil from the top, or at the foot of the quarry, down to the natural bed, sometimes both ; also in getting a vertical face and open ends for a really effective or great blast, so that an ordinary quarry does not pay for the first two or three months.

## MEASUREMENT.

Although the stones are always quarried larger than the net size required, the latter only is paid for. If the stones are bevelled or angular, the largest dimensions square with each other are reckoned.

**Soldier stones** are building stones laid on the edge in contradistinction to stones laid on their natural bed as generally specified and carried out, but there are many exceptions to this rule because it has been found by actual experiment that some stones (as at Glasgow, where it is usual to set all building stones on their edge except cornices) are actually stronger on their edge than on their natural bed. The Sydney sandstone possesses similar properties, as proved by Professor Warren. The bank at the corner of George and Hunter-streets, the pilasters, $18\frac{1}{4}$ feet in height by about 2 feet square ; also the stones forming the pilasters opposite the granite columns of the Sydney Post Office, about 12 feet high, are Soldier stones.

The following prices apply to Sydney, Parramatta, and Hobart for freestone, and Melbourne for bluestone, and include delivery within two miles of the quarry at these places, on account of the large and constant demand :—

## FOOTINGS, DIMENSION STONES, &c.

### Scappled stone at different Australian quarries.

*Wages, 1/3 per hour.*

| | Freestone. | | Bluestone. | |
|---|---|---|---|---|
| | s. | d. | s. | d. |
| Footings in 12in. through stones, per perch of 25 cubic feet | 15 | 0 | 16 | 0 |
| Parapet, scappled on both sides, per perch, 25 cu. ft. | 23 | 0 | 24 | 0 |
| 9in. ashlar, 33 lin. ft., per perch | 15 | 0 | 16 | 0 |
| Rubble, per perch of 25 cubic feet | 3 | 6 | 4 | 6 |
| Ballast, per perch | 1 | 0 | 2 | 0 |
| Lintels, steps or sills (12 x 6), at per lin. ft. | 0 | 8 | 0 | 10 |

## DIMENSION STONES.

| | | | | |
|---|---|---|---|---|
| Dimensions, stones, from 6 to 12 cubic feet., per cu. ft. | 1 | 3 | 1 | 4 |
| Ditto, 12 to 24 cubic feet | 1 | 6 | 1 | 8 |
| Ditto, 24 to 36 cubic feet | 1 | 9 | 2 | 0 |
| Ditto, 36 to 48 cubic feet | 2 | 0 | 2 | 6 |
| Ditto, 48 to 60 cubic feet | 2 | 6 | 3 | 0 |
| Flag stones, rough, 4 inches | 0 | 8 | 1 | 9 |

If more than 4ft. deep on natural bed one-third more than these prices.

## CURBS, GUTTERS, CUBES.

| | | | | |
|---|---|---|---|---|
| Cubes or paving stones, 4 × 9 × 12 or 15 inches, per super. yard | 4 | 0 | 7 | 0 |
| 9-in. picthers, 9 × 9 × 9, per super yard | 3 | 6 | 6 | 0 |
| Curbs, for footpaths, c., 15 × 6, p.l.f. | 0 | 6 | 0 | 9 |
| Ditto, 18 × 8 | 0 | 8 | 1 | 0 |

Grindstones, 6in. wide :—2ft. dia., 10/– ; 2ft. 6in., 14/– ; 3ft., 25/– ; 3ft. 6in., 35/– ; 4ft., 60/– ; 4ft. 6in., 80/–

Ditto, 10in. wide :—3ft. dia., 35/– ; 3ft. 6in., 47/– ; 4ft., 75/– ; 4ft. 6in., 100/–

### Building Stone.

SCAPPLED.

*Delivered in Melbourne, per cube foot.*

| | s. | d. |
|---|---|---|
| Spring Bay (Hobart Town) free sandstone, up to 15 cubic feet | 4 | 6 |
| Waurn Ponds (Geelong), free limestone, any size | 2 | 9 |
| Oamaru (N. Zealand) do. up to 30 cubic feet | 3 | 0 |
| Ditto do. up to 60 cubic feet | 3 | 6 |
| Sydney free sandstone, up to 30 cubic feet. | 3 | 6 |
| Ditto do. up to 60 cubic feet | 4 | 0 |
| Stawell sandstone | 3 | 6 |

### Scappled Stone at Melbourne, per cubic foot.

| | s. | d. |
|---|---|---|
| Kapunda (S. Australia), marble | 3 | 6 |
| Gabo Island red granite for columns | 18 | 0 |
| Harcourt grey granite (Mt. Alexander) | 3 | 3 |
| Barrabool Hills (Geelong), free sandstone, in blocks | 2 | 6 |
| Wallunga Slate (S. Aust., Port Pirie) | 3 | 0 |
| Tarlee Stone (Adelaide Railway Station) | 3 | 6 |

### Scappled Stone.

*At Quarry, per cube foot.*

| | Quarry. s. | d. | Sydney. s. | d. |
|---|---|---|---|---|
| Moruya (N.S.W.) grey granite | 4 | 0 | 8 | 0 |
| Bluestone (Malmsbury, Vic.), up to 10 cubic feet | 2 | 9 | 4 | 6 |
| Ditto do. 15 ,, | 3 | 0 | 5 | 0 |
| Ditto do. 20 ,, | 3 | 6 | 6 | 0 |
| Ditto do. 30 ,, | 4 | 6 | 7 | 0 |
| Ditto do. 40 ,, | 5 | 6 | 8 | 0 |
| Port Chalmers Stone, about two-thirds the prices given for bluestone. | | | | |
| Portland (N.S.W.) Limestone, at quarry | 1 | 2 | | |
| Cooma do., grey soft granite, at the quarries | 1 | 6 | | |

### Scappled Stone, &c., in Launceston.

| | s. | d. |
|---|---|---|
| Sandstone, per cubic foot | 3 | 0 |
| Window sills, 12 × 6, per lin. ft. | 3 | 0 |
| Primary grey stone, for rough curbing foundations, &c., per cube yard | 5 | 0 |

Bluestone is obtained at Piper's Creek, on the Tamar River, 20 miles from Launceston.

### Scappled Stone, &c., at Hobart.

| | |
|---|---|
| Ti-tree freestone up to 14 cubic ft. delivered at Railway Station, per cube foot | 3 0 |
| Knocklofty brown freestone in general use, or from O'Brien's Bridge and Glenorchy | 2 0 to 2 6 |
| Knocklofty rubble stone, per 1 horse load | 8 0 |
| Flagging, from Risden's, per super ft. | 0 6 |

### CARTAGE.

| | |
|---|---|
| Carting bluestone, granite, or sandstone, one mile, per ton (See "Weight of Materials") | 2 0 |
| Add for each mile beyond, per ton | 0 8 |
| Carting rubble, per perch (measured in wall), one mile | 2 8 to 3 0 |
| Add for each additional mile | 0 8 to 0 10 |

## QUARRYING BY MACHINE FOR EXTENSIVE WORKS.

In large marble quarries, West Portland, steam channeling machines, (with boiler attachment) are used for outlining dimension stone work with success.

Also in the Oolitic limestone quarry, at Bloomington, Ind., and the Columbian marble quarry, the rigid head and swivel head channelers for vertical and inclined cutting, excavate gutters 6½ inches wide to a depth of 14 and 15 feet, less width for less depth.

The wheel pits at Niagara Falls, 185 feet x 21 wide, 480 feet long, and great Canal of Lake Superior Power Co., outlining sides with smooth faces. Compressed air was the motive power to operate the channelers, the centre material was removed by explosives.

**The Swivel-Head machine** is more favoured in marble quarries, on account of its light weight, great cutting capacity and wide range of adjustability to follow the grain, and get best results in design from the coloured marbles, cutting straight faces to 10 feet if desired, and working up 30 degrees inclines on cogged rails.

The slate quarry at Argyl, Pa., also use Swivel-Head channelers, 3in. gauge.

**Marble cutting,** 15 to 20 feet x 3in. wide, per minute = 3 to 5 super feet guttering per minute.

**Soft Sandstone and Limestone cutting** 20 to 30 feet x 3in. wide, =5 to 7ft. 6in., super feet per minute.

Where extensive blocks of Sandstone occur without beds, an under cutter or steam pick is used to cut horizontally.

Price for Channeler, £360 (on wharf or rail) ; Under-cutter, £280.

## SUBMARINE.

Owing to variable conditions, no fixed prices can be quoted. Boring holes for sandstone to receive foot of piles, vary from 20/– to 60/– each.

In bridge foundations, preparatory work in clearing silt away is usually done by grab dredges. *See* DREDGING.

Scott & Goodsir's Patent Submarine Rock Excavator and Rock-Drill, with and without the aid of divers, has done valuable work in Sydney Harbour sandstone, 20 to 30 feet below water. In appearance, it is not unlike a steam pile-driving structure, built on end of punt, with a long cutting chisel working in frame-work, 60 feet high. The operators on platform 37 feet up, as well as on deck, where boiler and machinery are situated. For particulars apply Wildridge & Sinclair, Engineers, 82 Pitt-street.

**Spikes** may be successfully driven under water 12 to 20 feet deep, by placing straight pipe or tube in position. Drop spike down inside tube and drive home with iron or steel rod inside tube.

**Drilling for explosives** under water, with hand jumper from surface enclosed in pipe driven into debris to surface of rock for guidance of work and charging can be successfully accomplished.

**Snagging rivers** by blasting with dynamite, as practised in the Waikato River, New Zealand. The inspection was made by an hydraulic telescope (a gal. iron tube, with glass fixed at end.) The holes were bored with 1¼in. steel auger.

# MASONRY.

**In estimating** the cost of **cubed** or **dimension stone** at per *cubic foot*, first take the average size of the stones required, and the cost of such stones delivered on the work. Take next the number of superficial feet of face-work on the stone, then the number of feet super. of dressed beds and joints in the same stone, add the cost of setting the stone, and you cannot fail to arrive at a correct estimate of the net cost and description of masonry, to which add profit according to the total cost of the work and the time required to finish it.

The different portions of masonry should also be classed as follows, if estimating at per cubic foot :—

*One-face work*, as ashlaring, or common face-work, base courses, plinths, friezes, &c.

*Two-face work*, as quoins, imposts, architraves, parapets, &c.

*Three-face work*, as copings, strings, cornices, pilasters, &c.

*Four or more face work*, as newels and caps, to ditto, blocks to cornices, chimney caps, &c. By such means the defective system of estimating may be pruned of much of its uncertainty ; the proper, because the most correct method, being to estimate the rough stone at per cubic foot, and the labour in dressing at per foot super.

Tooled margins, if round rock, or quarry face, which is not measured, to be taken by the foot super, at double their width.

Raised work to be measured as *flat* work, the margins being taken as sunk work.

### Examples of Estimating.

*Stone Cornice* (*Sydney freestone*) *on* 14 *inch brick wall.*

| | s. | d. |
|---|---|---|
| Stone delivered 2.0 × 1.0 = 2 cube feet at 1s. 3d. .. .. | 2 | 6 |
| Setting and mortar, 2 cubic feet at 9d. .. .. .. .. | 1 | 6 |
| Mouldings, 24in. girt, cut and rubbed, 2 sup. ft. at 2s. 6d. .. | 5 | 0 |
| Weathering, chiselled and rubbed, 1 sup. foot .. .. | 1 | 3 |
| Beds and joints, about 3 sup. feet at 4d. .. .. .. | 1 | 0 |
| Per lineal foot .. .. .. .. | 11 | 3 |

Or 5s. 7½d. per cube foot — cost price.

**Gate Cap.**—An octagon pointed or pyramidal gate cap in Sydney freestone, about 22in. by 22in. by 30in. high, took a stonecutter 48 hours to dress it, or at the rate of 6 hours per cube foot ; this at 1s. 6d. per hour = 9s. per cube foot for labour only without *sharps* or profit.

**Curved pediment** in Sydney freestone, with cornice under; size of stone, 6ft. 8in. × 2ft. 4in. × 2ft. — 31 cubic feet.

| | £ | s. | d. |
|---|---|---|---|
| Beds and joints, 25ft. × 2ft. — 50 super feet at 4d. .. .. | 0 | 17 | 0 |
| Rubbed curved face, 3ft. x 1ft. — 3 super feet at 1s. 4d. .. | 0 | 4 | 0 |
| Ditto curved and moulded, largest girt, 30 super feet at 3s. 4d. | 5 | 0 | 0 |
| Banking and superintendance .. .. .. .. .. | 0 | 10 | 0 |
| 4s. 3d. per cubic foot. for labor only — .. | 6 | 11 | 0 |
| All materials add 31 cubic feet stone at 1s. 6d. .. .. | 2 | 6 | 6 |
| Setting and cement mortar, 31 cubic feet at 1s. .. .. | 1 | 11 | 0 |
| | 10 | 8 | 6 |

31 cubic feet — 6s. 9d. per cubic foot cost price.

Galvanised iron cramps and bond irons about $2\frac{1}{2} \times \frac{1}{4}$, used in Government buildings in Sydney, equal to about 1lb. to 5 cubic feet of masonry.

## SANDSTONE QUARRIED AND DRESSED.

PYRMONT STONE.

| | per foot. s. | d. |
|---|---|---|
| Window sills, 12 x 6, weathered and throated, 3ft. to 7ft. daylight | 3 | 0 |
| Ditto, sunk, weathered and throated .. .. .. .. | 3 | 6 |
| Ditto, larger sills, per cubic foot .. .. .. .. | 3 | 6 |
| Steps, 12 x 6, tread and riser, dressed, bedded and jointed .. | 2 | 6 |
| Copings and plain, 10 x 12, one clean face, and cham., from .. | 3 | 0 |
| Ditto, splayed and throated, 12 x 6, two clean faces and cham., from | 3 | 6 |
| Round Top, 12 x 3, for steps and garden coping .. .. | 1 | 6 |
| Kerb and Guttering, 12 and 18 x 9, sawn faced .. .. | 2 | 8 |
| Building Rubble, Sydney and Suburban Quarries, per perch ($16\frac{1}{2}$ft.) .. .. .. .. .. .. | 3 | 6 |
| Squared Rubble, Ditto, per perch ($16\frac{1}{2}$ft.) .. .. .. | 6 | 0 |
| Base Course, 12 x 12, per cubic foot. .. .. .. .. | 1 | 0 |

*Materials within 2 miles, per perch of 25 cubic feet.*

| | Sydney Sandstone. £ | s. | d. | Melbourne Bluestone. £ | s. | d. |
|---|---|---|---|---|---|---|
| 18in. x 12in. footings, from 2 to 3 feet long, quarry dressed, except beds which are rough axed | 1 | 10 | 0 | 1 | 15 | 0 |
| Larger footings, quarry faces, with clean-axed or chiselled beds and joints .. .. .. | 2 | 0 | 0 | 2 | 10 | 0 |
| Hammer squared course rubble, with 3 through stones, per perch .. .. .. .. | 0 | 15 | 0 | 0 | 18 | 0 |
| Random rubble in walls or abutments, with 3 through stones .. .. .. .. | 0 | 12 | 6 | 0 | 15 | 0 |
| Ashlar pitched, quarry faced; axed beds and joints and 3 through stones .. .. | 1 | 15 | 0 | 2 | 5 | 0 |

## ASHLAR AND BUTTRESSES.

*Materials within 2 miles.*

| | Sydney Sandstone. £ s. d. | Melbourne Bluestone. £ s. d. |
|---|---|---|
| **Ashlar** church, warehouse, or school walls, neat axe and draft both sides, and with axed beds and joints, per perch .. .. .. .. | 2 5 0 | 4 5 0 |
| 12 inch parapet walls, ditto .. .. .. | 2 10 0 | 4 10 0 |
| Ditto rough for plastering .. .. | 1 15 0 | 3 0 0 |
| **Ashlar** axe and draft outside and scappled inside for plastering, axed beds and joints.. .. | 2 0 0 | 2 17 0 |
| **Buttresses cube stones,** dressed 3 sides .. .. | 3 5 0 | 5 10 0 |
| If more than 10 feet high, add for each 10 feet in height .. .. .. .. .. .. | 0 2 6 | 0 2 8 |
| **Underpinning Ashlar Wall** in 12 inch courses, 2 courses taken out and filled up with brick in cement, secured at top with iron wedges, wall 2ft. 6ins. thick, per lin. ft. .. .. | 1 5 0 | 1 15 0 |

N.B.—Brisbane and Mount Somers sandstone same as at Sydney.

**Mortar required,** per perch—

Rubble contains about 5 cubic feet of mortar.

**Ashlar,** about 2 cubic feet.

**Solid masonry** from 1 to 1½ cubic feet.

To obtain these proportions of mortar, use one bushel of sand for each cubic foot of mortar required, in addition to the usual proportion of stone lime.

## CULVERTS AND TUNNELS.

*All Materials.*

| | £ s. d. |
|---|---|
| 18 inch square hammer dressed, with true beds and joints (sandstone handy), per lin. yard .. .. .. .. .. | 1 10 0 |
| 24 inch square ditto ditto do. .. .. .. .. | 2 0 0 |
| 5 to 10 feet culverts with rough radiating joints, including the ends or faces of culverts, per cu. yd... .. .. .. | 3 0 0 |
| 18 inch radiated masonry to tunnels, all through stones, curved, picked face and boatsered joints per cubic yard in sandstone .. .. .. .. .. .. .. .. | 4 0 0 |

## LABOUR ONLY, PER FOOT SUPER.

*Wages, 1/4½ per hour.*

| | Spring Bay Sandstone. | | Bluestone or Basalt. | | Sydney Sandstone | |
|---|---|---|---|---|---|---|
| | s. | d. | s. | d. | s. | d. |
| Rubbed sandstone or fine axed bluestone .. | 1 | 6 | 3 | 0 | 1 | 3 |
| Sparrow picked sandstone, or fine tool stroked bluestone .. .. .. .. .. | 1 | 6 | 3 | 0 | 1 | 3 |
| Clean chiselled sandstone or axe and draft bluestone .. .. .. .. .. | 1 | 0 | 1 | 8 | 0 | 9 |
| Ditto, fine chiselled sandstone, or tool stroked | 1 | 2 | 2 | 4 | 1 | 0 |
| Boasted or chiselled sandstone, or axe dressed bluestone for beds and joints .. .. | 0 | 5 | 0 | 8 | 0 | 4 |
| Pitched quarry face .. .. .. .. | 0 | 1 | 0 | 2 | 0 | 1 |
| Vermiculated work, sharp arrises, clean tooled | 3 | 0 | 6 | 0 | 2 | 6 |
| Ditto, ridges not tooled .. .. .. .. | 2 | 3 | 4 | 6 | 2 | 0 |
| Fretwork, inch bands, clean tooled .. .. | 2 | 6 | 5 | 0 | 2 | 0 |
| Ditto, 2 inch bands, ditto .. .. .. | 2 | 0 | 4 | 0 | 1 | 8 |
| Mouldings, tooled or rubbed large .. .. | 2 | 0 | 4 | 0 | 1 | 8 |
| Ditto do. small .. .. .. | 3 | 0 | 6 | 0 | 2 | 6 |

Gothic or other under cut mouldings one-half more, on account of extra sinking and under cutting.

### Labour on Various Stones.

**For Bowral Trachyte,** reckon 3 times on Sydney sandstone.

If in **Cooma**, N.S.W., **Soft Granite,** reckon the same as for bluestone.

For **Brisbane** or **Mount Somers Sandstone** reckon same as for Sydney sandstone.

If in **Moruya**, N.S.W., **Grey Granite,** or **Adelaide marble,** or the **Grampian** (Vic.) **Granite,** reckon one-half more than bluestone.

But if in **Gabo Island Red Granite,** or **Harcourt** (Vic.), **Grey Granite,** reckon double the cost of similar work to bluestone.

## THE RELATIVE PROPORTION

**For fine axed or finest chiselled plain face per super foot is—**

For **Oamaru,** New Zealand, **Free Limestone,** 6d.

**Barrabool Hills or Darley Free Sandstone,** 9d.

**Waurn Ponds Free Limestone,** 11d.

**Sydney,** Mount Somers, or Brisbane Free Sandstone, 1s. 4d.

**Spring Bay** Sandstone, 1s. 6d.

**Brisbane** Porphyry, 2s.

**Stawell** Sandstone, 2s. 3d.

**Bluestone,** or Cooma Granite, 3s.

**Adelaide** marble, or Grampian (Vic.) or **Moruya** (N.S.W.) Granite, 4s. 6d. to 5s. 3d.

And for **Gabo Island** or **S.A. Red Granite,** or **Harcourt Granite,** 6s. per super foot.

**The Oamaru Free Limestone** is similar to the South Australian free limestone. (See Building materials of South Australia at the end of this book.) It has been quarried at Oamaru at 4d. p. cube foot and a Theatre built there at 8d. per cube foot worked and set; this would be at the rate of 16s. 6d. per perch.—Like other soft lime freestone it is easily cut with a handsaw.

### Stone Cutting.

*Labour only, per foot run.*

| | Sydney Sandstone. s. | d. | Spring Bay Sandstone. s. | d. | Oamaru Stone. s. | d. |
|---|---|---|---|---|---|---|
| Single bead, reed or flute, ¾ inch or inch .. ... .. | 0 | 6 | 0 | 8 | 0 | 3 |
| Double do., do. ... ... | 0 | 8 | 0 | 10 | 0 | 4 |
| Treble do. or moulded .. | 1 | 0 | 1 | 3 | 0 | 6 |
| Diminished flutes, from 1 inch to 2 inches diam. .. . | 0 | 9 | 0 | 11 | 0 | 5 |
| Ditto, from 2 to 3 inches do .. | 1 | 0 | 1 | 3 | 0 | 6 |
| Ditto from 3 to 4 inches do ... | 1 | 2 | 1 | 5 | 0 | 7 |
| Ditto, from 4 to 5 inches do .. | 1 | 3 | 1 | 7 | 0 | 8 |
| Add one foot for each mitre in panels or returns. | | | | | | |
| Holes jumped or drilled for bolts, &c., 1 or 1½ diameter .. .. .. | 1 | 0 | 1 | 3 | 0 | 6 |
| Ditto do 2 inches diameter .. | 1 | 2 | 1 | 5 | 0 | 7 |
| Ditto do 3 inches do .. | 1 | 3 | 1 | 7 | 0 | 8 |
| Ditto do 4 inches do .. .. | 1 | 6 | 1 | 10 | 0 | 9 |

**Brisbane and Mount Somers sandstone** same as Sydney sandstone.

### Stone Cutting.

| | *Labour only, each.* | *s.* | *d.* | *s.* | *d.* | *s.* | *d.* |
|---|---|---|---|---|---|---|---|
| Mortice for iron rails, &c., 1 inch sq. .. | | 0 | 5 | 0 | 6 | 0 | 3 |
| Ditto do 2 do .. .. | | 0 | 6 | 0 | 8 | 0 | 4 |
| Ditto do 3 do .. .. | | 0 | 9 | 0 | 11 | 0 | 5 |
| Dentules, 2 inches deep on face, with band.. | | 0 | 5 | 0 | 7 | 0 | 3 |
| Ditto, 4 do do .. .. .. .. .. | | 0 | 0 | 0 | 11 | 0 | 5 |
| Triglyphs and guttæ or drops, for 12 inch Doric column .. .. .. .. | | 3 | 0 | 4 | 0 | 1 | 9 |
| Ditto, 24 inch do .. .. .. .. | | 4 | 6 | 5 | 6 | 2 | 6 |
| Ball for foot or finial 6 inches diam. .. | | 7 | 6 | 10 | 0 | 4 | 0 |
| Ditto 8 do.. .. .. | | 9 | 0 | 11 | 6 | 5 | 0 |
| Ditto 12 do.. .. .. | | 10 | 6 | 13 | 0 | 6 | 0 |

## STONE SETTING.

| | Sydney Sandstone. | Spring Bay Sandstone. | Oamaru Freestone |
|---|---|---|---|
| | s d. | s. d. | s. d. |
| Balusters, either round or square, if 4 inches largest diam., or side, and 12in. high .. | 9 0 | 11 6 | 5 0 |
| Ditto if 4in. diam., or side, and 18in. high .. | 10 0 | 12 6 | 5 3 |
| Ditto, 8in. do. and 24in. high .. .. | 11 0 | 14 0 | 6 0 |

**Brisbane sandstone** same as Sydney sandstone. Average cost of architrave jamb, 10ft. x 2ft. x 1ft., front and reveal rubbed, including mouldings, 21in. girt, reveal bevelled, side checked, all other faces clean chiselled, *cost 4s. 3d. per cube foot, labor only*, in Sydney sandstone, exclusive of setting, mortar, cramps, stone, &c.

**Proportionate cost of sunk and circular work.**—Sunk work, 3 in. deep, one-fourth more than similar straight work.

Sunk work, 6 in. deep, one-half more.

Circular work, from one-third to one-half more than similar straight work.

Circular-circular or spherical, from two to four times, according to sharpness of curve.

### SETTING CUBE STONES.

| *Labour and Mortar, per foot cube.* | s. | d. |
|---|---|---|
| Setting ashlar facing, 4½in. to 14 in. on bed and less than 1½ cube feet .. .. .. .. .. .. .. | 0 | 8 |
| Setting freestone, bluestone, or granite in blocks not more than 3 cubic feet, including scaffolding, haulage, cramps, lewis and grooves .. .. .. .. .. .. | 0 | 6 |
| Ditto, if carved or moulded, do. .. .. .. .. | 0 | 7 |
| Ditto, block from 2 to 6 ft. long, do. .. .. .. .. | 0 | 8 |
| Ditto, do. if moulded or carved above 6ft. long .. .. | 1 | 0 |
| **Dressing and setting** Footings, per perch .. .. .. | 7 | 6 |
| Ditto. do. Rubble in walls, per perch .. .. .. | 10 | 0 |

For every 10 feet in height above 40 feet, add one-fourth the above rates. One lb. cramps will do from 5 to 10 feet of masonry.

**Extra large stones.**—If the stones for cornice exceed 20 cub. ft. each, add one-fifth extra to the dressing, on account of the difficulty in handling or turning the stone while being worked ; but if most of the stones in the building, viaduct, &c., are of a large size, and the tackle is sufficient to move them easily, it will be found cheaper to dress, hoist, and set large than small stones, because the beds and joints, and the time required for hoisting and setting, are less in proportion to the cubic contents of the former as compared with the latter. This remark applies to oregon tripod pedestal and steam cranes, the cost of which is given under the head of Electrical, or to common cranes now mostly used. *See* PLANT AND TOOLS.

**Masonry and stonecutting.**—The remarks under these headings will include every description of stonework. In carved work the stone is cubed in the rough ; if prepared by the stonecutter, the clean chiselling or boastering is reckoned by the super. foot, to which is added the cost of carving. The setting or fixing and mortar is generally added to the cost of stone at per cube foot. All metal work, such as joggles, cramps, bolts, &c., or running in lead or sulphur is reckoned by the pound.

## STONE CARVING.

*Labour only, each item.*

Add 20 per cent. for roughing out by mason.

| | Spring Bay Stone. | | | Sydney Stone. | | | Oamaru Stone. | | |
|---|---|---|---|---|---|---|---|---|---|
| | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| Ionic capital, Grecian or Roman for 6 in column (major diam.) | 2 | 16 | 0 | 2 | 5 | 0 | 1 | 6 | 0 |
| Ditto 9in. do. do. | 3 | 17 | 0 | 3 | 5 | 0 | 1 | 17 | 0 |
| Ditto 12in do. do. | 5 | 7 | 0 | 4 | 10 | 0 | 2 | 10 | 0 |
| Ditto 18in. do. do. | 7 | 0 | 0 | 6 | 5 | 0 | 3 | 10 | 0 |
| Ditto 24in. do. do. | 10 | 0 | 0 | 8 | 10 | 0 | 5 | 0 | 0 |
| Ditto 30in. do. do. | 12 | 0 | 0 | 9 | 15 | 0 | 6 | 0 | 0 |
| For quarter pilasters one half and for bases one-fourth the above. If enriched, add 20 per cent. | | | | | | | | | |
| Modillions, Ionic, or plain moulded, 3in. projection | 0 | 4 | 6 | 0 | 3 | 9 | 0 | 2 | 3 |
| Ditto 4½in. do., plain moulded | 0 | 6 | 0 | 0 | 5 | 0 | 0 | 3 | 0 |
| Ditto, 6in. do., do. | 0 | 7 | 6 | 0 | 6 | 3 | 0 | 3 | 9 |
| Cantilevers or trusses, 9in. do. do. | 0 | 10 | 6 | 0 | 8 | 9 | 0 | 5 | 3 |
| Ditto, 12in. do. do. | 0 | 15 | 0 | 0 | 12 | 6 | 0 | 7 | 6 |
| Corinthian or composite capital for 6in. (major diam.) column | 4 | 10 | 0 | 3 | 15 | 0 | 2 | 5 | 0 |
| 9in. do. do. | 7 | 10 | 0 | 6 | 5 | 0 | 3 | 15 | 0 |
| 12in. do. do. | 12 | 0 | 0 | 10 | 0 | 0 | 6 | 0 | 0 |
| 18in. do. do. | 16 | 0 | 0 | 14 | 0 | 0 | 8 | 0 | 0 |
| 24in. do. do. | 20 | 0 | 0 | 17 | 0 | 0 | 10 | 0 | 0 |
| 30in. do. do. | 24 | 0 | 0 | 21 | 0 | 0 | 12 | 0 | 0 |
| For quarter pilasters one-half and for bases one-fourth the above. | | | | | | | | | |
| Pateræ or rosette (rich), 4in. diam. | 0 | 7 | 6 | 0 | 6 | 0 | 0 | 3 | 9 |
| Ditto 6in. do. | 0 | 9 | 0 | 0 | 7 | 6 | 0 | 4 | 6 |
| Ditto 9in. do. | 0 | 15 | 0 | 0 | 12 | 6 | 0 | 7 | 6 |
| Centre flower (rich) 12in. diam. | 1 | 2 | 6 | 0 | 19 | 0 | 0 | 11 | 3 |
| Ditto 18in. do. | 1 | 17 | 6 | 1 | 12 | 0 | 0 | 18 | 9 |
| Ditto 12in. do. | 2 | 15 | 0 | 2 | 6 | 0 | 1 | 7 | 0 |
| Mask or head, 4in. | 0 | 9 | 0 | 0 | 7 | 6 | 0 | 4 | 6 |
| Ditto 6in. | 0 | 18 | 0 | 0 | 15 | 0 | 0 | 9 | 0 |
| Ditto 9in. | 1 | 4 | 0 | 1 | 0 | 0 | 0 | 12 | 0 |
| Ditto 12in. | 1 | 10 | 0 | 1 | 5 | 0 | 0 | 15 | 0 |
| Ditto 15in. | 1 | 17 | 0 | 1 | 11 | 0 | 0 | 18 | 0 |

| | Spring Bay Stone. | | | Sydney Stone. | | | Oamaru Stone. | | |
|---|---|---|---|---|---|---|---|---|---|
| | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| Acanthus leaf, 4in. long .. .. | 0 | 6 | 0 | 0 | 5 | 0 | 0 | 3 | 0 |
| Ditto 6in. do. .. .. | 0 | 9 | 0 | 0 | 7 | 6 | 0 | 4 | 6 |
| Ditto 9in. do. .. .. | 0 | 12 | 0 | 0 | 10 | 0 | 0 | 6 | 0 |
| Ditto 12in. do. .. .. | 0 | 15 | 0 | 0 | 12 | 6 | 0 | 7 | 6 |
| Loftus leaves, one-half the above. | | | | | | | | | |
| Oak or laurel wreath, 6in. diam. .. | 0 | 15 | 0 | 0 | 12 | 6 | 0 | 7 | 6 |
| Ditto do. 9in. do. .. | 0 | 18 | 0 | 0 | 15 | 0 | 0 | 9 | 0 |
| Ditto do. 12in. do. .. | 1 | 4 | 0 | 1 | 0 | 0 | 0 | 12 | 0 |
| Oak leaf and corn frieze, with leaves 2in. long, p. ft. sup. .. .. | 1 | 7 | 0 | 1 | 2 | 6 | 0 | 13 | 6 |
| Ditto do. 4in. do. do. .. .. | 1 | 1 | 0 | 0 | 17 | 6 | 0 | 10 | 6 |
| Panels sunk and moulded from 9 to 12in. square, and 1½ to 2in. deep rubbed | 0 | 15 | 0 | 0 | 12 | 0 | 0 | 7 | 6 |
| If undercut, add from 25 to 50 per cent. | | | | | | | | | |

## CARVING MOULDINGS.

| | *Per foot run.* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Egg and dart moulding, 1½in. girt .. | 0 | 4 | 6 | 0 | 3 | 9 | 0 | 2 | 3 |
| Ditto do. 2in. do. .. | 0 | 5 | 3 | 0 | 4 | 6 | 0 | 2 | 8 |
| Ditto do. 3in. do. .. | 0 | 6 | 0 | 0 | 5 | 0 | 0 | 3 | 0 |
| Ditto do. 4in. do. .. | 0 | 6 | 9 | 0 | 5 | 9 | 0 | 3 | 5 |
| Rope or cable moulding 2in. do. .. | 0 | 3 | 0 | 0 | 2 | 6 | 0 | 1 | 6 |
| Ditto do. 3in. do. .. | 0 | 4 | 6 | 0 | 3 | 9 | 0 | 2 | 3 |
| *Guillochis* moulding, single, 3in. .. | 0 | 6 | 0 | 0 | 5 | 0 | 0 | 3 | 0 |
| Ditto, 4in. ditto .. .. .. | 0 | 7 | 6 | 0 | 6 | 3 | 0 | 3 | 9 |
| Ditto, 6in. ditto .. .. .. | 0 | 9 | 0 | 0 | 7 | 6 | 0 | 4 | 6 |
| Ditto, enriched, add 50 per cent. | | | | | | | | | |

N.B.—The whole of the above items are presumed to be prepared by the stonecutter as required, if not, add from 20 to 25 per cent. for preparing the stone or roughing out, and 8 per cent. for mortar and setting.

**Stone Carving,** which is generally fixed at a considerable height above the observer, does not require that degree of finish or delicacy of outline required in wood carving, which is generally fixed much nearer to the eye. In all ornamental work the time required to model or carve a given *Piece* depends materially upon the degree of finish, or *minutiæ*, aimed at.

If any of the above items are required in Barrabool Hills, or South Australian freestone, the price will be about one-half that given for Spring Bay stone; for bluestone twice the price of Spring Bay stone; and for Adelaide marble or Moruya granite about thrice the cost of Spring Bay stone.

N.B.—In stone cutting the superficial measurement of girt is always taken, but when let at one price with the material, the length and breadth only are taken, and not the girt, for superficial measurement. Generally when the materials and labour are let together the same measurement is taken as for materials only.

## BLUESTONE.

*Price at Works, Footscray, Melbourne.*

| | s. | d. |
|---|---|---|
| In dimension stones up to 10 cubic feet | 2 | 9 |
| In dimensions less than 8ft. long, up to 16 cubic feet | 3 | 3 |
| In dimensions less than 8ft. long, up to 20 cubic feet | 3 | 6 |

### FLAGGING.

| Thickness | 1in. | | 1½in. | | 2in. | | 2½in. | | 3in. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| **Flagging,** sawn and sqrd., per super ft. | 1 | 0 | 1 | 1½ | 1 | 2 | 1 | 3 | 1 | 4 |

If enamelled slates, 1s. 6d. per foot extra, measured on all faces.

### LANDINGS.

| Thickness | 4in. | | 5in. | | 6in. | | 7in. | | 8in. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| **Landings,** sawn and sqrd., up to 12 c. ft. | 1 | 9 | 2 | 3 | 3 | 6 | 3 | 10 | 4 | 0 |
| **Bluestone,** 12 to 18 cubic feet | 0 | 0 | 0 | 0 | 3 | 10 | 4 | 2 | 4 | 6 |
| Ditto 18 to 28 do. | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 4 | 5 | 8 |

### BLUESTONE STEPS, &c.

| | s. | d. |
|---|---|---|
| **Bluestones,** 12 x 7 **steps,** axed, per lin. ft. | 3 | 0 |
| Ditto, ditto, with moulded nosing, fine axed | 6 | 6 |
| Ditto, curbing dressed and mortised for iron palisading, 12in. x 7in., per lin. ft. | 7 | 0 |
| **Sawing,** per face, over 12in. thick, per support | 0 | 9 |

### LABOUR ONLY, LAYING.

*Per yard super. in Melbourne.*

| | s. | d. |
|---|---|---|
| **Channelling,** with 7in. Bluestone pitchers in sand | 0 | 10 |
| Cube Pitching, with 4 x 9 pitchers, in sand | 1 | 3 |
| **Bluestone curbing,** 18 x 6, rough axed and laid p.l.y. | 5 | 0 |
| Ditto Circular ditto. ditto. | 6 | 0 to 9 0 |
| **Laying** 2in. to 3in. squared flagging, jointed in mortar, per sup. yd. | 1 | 0 |

## BLUESTONE CURBING.

*Per lineal foot in Sydney.*

| | £ | s. | d. |
|---|---|---|---|
| Second-class curbing, 14 x 10, chamfered and rough axed on top and 8ins. down side | 0 | 2 | 6 |
| First class ditto 12 x 12, worked as above | 0 | 2 | 10 |
| Bluestone cubes, 9 to 14in. long, by 4in. wide and 7 in. deep, delivered at wharf in Sydney at per 100 stones | 1 | 17 | 0 |
| Ditto, 9 x 4 x 6in. deep, per super yard | 0 | 12 | 0 |
| **Labour Laying Cubes.**—On prepared bed, grouted with cement, per sup. yds. | 0 | 2 | 0 |

## SLATE.

### Castlemaine Slate.

*Per foot super. in Melbourne.*

| Thickness .. | 1in. | | 1½in. | | 2in. | | 2½in. | | 3in. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| Rough slabs for coring .. .. | 0 | 0 | 0 | 5 | 0 | 6 | 0 | 7 | 0 | 8 |
| Flagging, squared only .. .. | 0 | 0 | 0 | 10 | 1 | 1 | 1 | 2 | 1 | 4 |
| Steps and sills, nosed and rubbed .. | 0 | 0 | 1 | 9 | 2 | 0 | 2 | 3 | 2 | 6 |
| Shelving rubbed both sides .. .. | 1 | 6 | 1 | 9 | 2 | 0 | 0 | 0 | .. | |
| Landings, squared and rubbed one side, up to 18 sup. ft. .. .. | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 2 | 0 |
| Ditto, from 18 to 28 s. ft. .. .. | 0 | 0 | .. | | .. | | 2 | 6 | 3 | 0 |
| Hearthstones, squared and rubbed .. | 1 | 2 | 1 | 4 | 1 | 6 | 1 | 8 | 1 | 10 |
| Urinals, wine bins, shelves, &c., rubbed; grooved, and prepared for fixing .. .. .. .. | 2 | 3 | 2 | 6 | 0 | 0 | .. | | 0 | 0 |

Mintara Slate (Adelaide), 2s. per sup. ft. for 1½in.

### Slate in the Cities.

| | £ | s. | d. |
|---|---|---|---|
| Chimney pieces, from .. .. .. .. .. .. | 1 | 15 | 0 |
| Baths, capped and cased, 6ft. 6in., x 2ft. 9in. x 2ft. 6in. .. | 20 | 0 | 0 |
| Plain form, with inclined back, 6ft. x 2ft. x 1ft. 10in. .. .. | 8 | 10 | 0 |
| Plain slate tanks, 4ft. x 2ft. x 2ft., to hold 100 gals. .. .. | 4 | 0 | 0 |

### SLATE CUT TO SIZES.

*Per square foot.*

| Under 7 ft. long ] .. | 1in. | 1¼in. | 1½in. | 2in. | 2½in. | 3in. |
|---|---|---|---|---|---|---|
| Rubbed one face and sqrd. .. | 1 7 | 1 8 | 1 10 | 2 4 | 3 3 | 3 9 |

**Labour extra to above.**

Nosing edge, 2d. ; Rubbed both sides, add 2d. per ft. ; Basinholes, 2/6 each ; Rounded corners, tap holes, mortices, each, 6d. ; Rebating or splayed edges, 3d. ; Grooving, 6d. ft. run. ; Soap dishes, 1/– ; Notches, 9d. ; Returned Nosings, 3d. each.

## TRACHYTE.

*Delivered on Rail or Steamer, Sydney.*

*Delivered on Rail or Steamer, from Bowral, N.S.W., Quarries.*

| | s. | d. |
|---|---|---|
| Footings and cube stones, quarry dressed, to 20 cubic ft. ; 4 c. ft. (*Large blocks as per arrangement.*) | 4 | 0 |
| Rough Slabs for Coring, 3in. thick, per sq. ft. | 2 | 3 |
| Ditto do. 9in. thick, per sq. ft. | 3 | 6 |
| Kerbing, 12in. x 18in., sawn face and edge, chamfered, square jointed, per lineal ft. | 5 | 0 |
| Guttering, 18 x 6 do. do. do. | 4 | 0 |
| Paving Cubes, 7in. x 4in. x 9in., for cartways, per 100 | 30 | 0 |
| Flagging, sawn and squared, 3in. thick, per sq. ft. | 2 | 6 |
| Landings, up to 6in. x 20 sq. ft. | 5 | 0 |

### STEPS, SILLS, &c.

| | | |
|---|---|---|
| Steps, 12 x 6, sawn tread and riser, per sq. ft. | 5 | 6 |
| Window sills, 12 x 6, weathered and throated, per sq. ft. | 6 | 0 |
| Girder Bearers, Corbels, and other dimension stones, per cubic ft. | 4 | 0 |
| Polishing flat surfaces, exclusive of axing, per sq. ft. | 6 | 6 |
| Red and Grey Granite, in the rough, per cubic ft. | 8 | 0 |
| Gal. Iron Joint Cramps, 1 x $\frac{1}{2}$, including cutting groove, set in cement, per inch run | 0 | $1\frac{1}{2}$ |
| Ditto, run in lead | 0 | 2 |
| **Copper Pipe,** for dowels, per foot run—$\frac{3}{4}$in., 1/– ; 1in. | 1 | 6 |

**Labour on Trachyte,** reckon 3 times for Sandstone.
**Labour on Granite.**—*See* page 59.

### GRANITE (HARCOURT).

| | | |
|---|---|---|
| On rail or wharf, Melbourne, per cube foot, up to 8 feet long— | | |
| Dimension stones, under 35 cube feet each | 3 | 3 |
| Dimension stones, under 50 cube feet each | 3 | 8 |
| Dimension stones, under 60 cube feet, each | 4 | 0 |
| Dimension stones, under 80 feet cube, each | 4 | 9 |

#### Sawing and Polishing.

*Per foot super., each face.*

| | | |
|---|---|---|
| **Sawing** Oamaru (N. Zealand) or Geelong freestone | 0 | 5 |
| Sawing Sydney or Spring Bay free sandstone | 0 | 7 |
| Marble, Italian, sawing or polishing each face | 1 | 6 |
| Black Marble ditto | 2 | 6 |
| Polishing Granite, Moruya, 3/-, and Harcourt | 5 | 0 |
| **Sawing** Malmsbury Bluestone | 0 | 9 |

Polishing columns or other circular work add extra, as for circular stone cutting, see page 61. The prices stated for polishing do not include the necessary dressing required to prepare for it.

SANDHURST GRANITE COLUMNS, &c.

*Polished Shafts, with swell.*

| *Per lin. foot.* | Melbourne. | Sydney. |
|---|---|---|
| | s. d. | s. d. |
| Small size columns, per sup. ft. .. .. .. | 40 0 | 45 0 |
| Large size ditto .. .. .. .. .. | 35 0 | 40 0 |
| Tuscan column, 10 feet (one stone) shaft with base and capital .. .. .. .. .. | £200 | £225 |

## SUMMARY—PRESENT RULING RATES.

*Materials, Labour, &c.*

| | | |
|---|---|---|
| Stone in blocks and dimensions, not less than 12 in. courses, with axed faces, beds and joints, set in mortar, per cubic. ft. .. | 2 | 6 |
| Ditto set in cement .. .. .. .. .. .. | 2 | 7½ |
| Stone footings, with axed beds and joints, set in mortar, per perch | 30 | 0 |
| Ditto set in cement .. .. .. .. .. .. | 32 | 6 |
| Foundations in Rubble, 12in. Random, set in mortar .. .. | 25 | 0 |
| Ditto set in cement .. .. .. .. .. .. | 29 | 6 |
| Through stone masonry, axed and draft, rough chiselled, bed joints, and back, set in mortar, per cubic ft. .. .. .. | 3 | 0 |
| Ditto set in cement, extra .. .. .. .. .. | 0 | 1½ |
| Ditto, with quarry face and joints set in putty .. .. .. | 2 | 9 |
| Through Stone Masonry, rough chiselled joints and back, Clean chiselled face, set in mortar .. .. .. .. .. | 3 | 4 |
| Rubbed face and joints, set with putty .. .. .. .. | 3 | 9 |
| Wrought stone Coring, for Sills and cornices .. .. .. | 2 | 8 |
| Ditto Through Stones set in cement, extra .. .. .. | 0 | 1½ |
| Ditto Window Sills, 1 to 14in. wide x 6¾ thick .. .. | 3 | 0 |
| Ditto, with rubbed face, sunk and throated .. .. .. | 3 | 6 |
| Wrought Steps, 12 to 14in. wide x 6 to 8in. risers, up to 7ft. long .. | 2 | 6 |
| Moulded work, extra, per foot super .. .. .. .. .. | 1 | 8 |
| Slate Damp-course, 2 courses in cement, per ft. super. .. | 0 | 9 |
| Lead Damp-courses, per cwt. .. .. .. .. .. | 25 | 0 |
| Bowral Trachyte, for steps, pat. axed heads and risers and axed drafts, on beds and joints, 14in. x 6in. .. .. .. | 7 | 9 |
| Ditto Patent axed upon send on above, extra .. .. .. | 3 | 4 |
| Slate, 1½in. thick, sawn and rubbed, set in cement under 7ft. long, per sup. ft. .. .. .. .. .. .. .. .. | 2 | 5 |
| 2in. ditto .. .. .. .. .. .. .. .. | 2 | 11 |
| Rubbed face, extra, per super ft. .. .. .. .. .. | | 5 |
| Round Nosing, extra, per foot run .. .. .. .. .. | 0 | 4 |
| Cost of Dwarf Iron Palisading, 3 ft. high, ⅞in. iron palisading, cast iron tops ; ¾in. iron short intermediate ; cast iron 2in. rails, 2 x ½in. .. .. .. .. .. .. .. .. | 4 | 0 |
| Leaded to stone coping, 11in. to 7in., draft margin Rock face ; ch. ch., Oct. Top and bedded on brickwork .. .. .. | 4 | 0 |
| Total, per lineal ft. .. .. .. .. .. | 8 | 0 |

## MARBLE.

There is such a richness and variety of colour, combined with soundness, in our Australian Marbles—qualities that commend themselves to the Architect and Builder—with the result that many of the principal Government and Private buildings, also vestibules of our principal theatres, are now tastefully faced and ornamented by their introduction. For localities where found *see* under BUILDING MATERIALS OF STATES.

# MARBLE MASON.

### AUSTRALIAN MARBLE.

From Commonwealth Marble Quarries at Calloola, Fernbrook, Borenore, &c.

### WHITE MARBLE SLABS.

ROUGH.

Prices F.O.B. Sydney.

| Slabs— | sup. ft. | Slabs— | sup. ft. | Slabs— | sup. ft. |
|---|---|---|---|---|---|
| ¾in. thick | .. 0 11 | 2½in. thick | .. 2 10 | 7in. thick | .. 7 6 |
| 1in. thick | .. 1 3 | 3in. thick | .. 3 3 | 8in. thick | .. 8 9 |
| 1¼in. thick | .. 1 4 | 4in. thick | .. 4 0 | 10in. thick | ..10 9 |
| 1½in. thick | .. 1 8 | 5in. thick | .. 4 9 | 12in. thick | ..13 0 |
| 2in. thick | .. 2 4 | 6in. thick | .. 6 0 | | |

### COLOURED MARBLE SLABS.

ROUGH.

Sawn Face Slabs, ¾in. thick, 1/3 ; 1in., 1/6 ; 1¼in., 1/10.
Rough Blocks, white, 8/– ; coloured, 9/– per cubic foot.

### MARBLE SLABS (POLISHED).

*Net Prices per Super Foot.*

| Thickness .. .. .. | ¾in. | 1in. | 1¼in. | 1½in. |
|---|---|---|---|---|
| White, from .. .. .. .. .. | 1 8 | 2 4 | 2 9 | 3 3 |
| Coloured, Rouge or St. Annes .. .. | 2 9 | 3 3 | 3 7 | 4 0 |

Black, 25 per cent. on above prices.
Tiles, 6in. x 6in. x ¾in., from 13/– per square yard.

WEIGHTS PER TON.

Marble, ¾in., 222ft. ; 1in., 167ft. ; 1¼in., 133ft. ; 1½in., 111ft. ; 2in., 83ft. ; 2½in., 66ft.

Slate, 1in., 150ft. ; 1¼in., 120ft. ; 1½in., 100ft. ; 2in., 75ft.

## EUROPEAN ROUGE AND ST. ANNE'S MARBLE.

Under 7 feet long, per foot square.

| Inches. | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 |
|---|---|---|---|---|---|---|---|
| Rough Slabs, Quarry Sizes .... | 2/4 | 2/11 | 3/7 | 4/2 | 5/6 | 6/8 | 7/9 |
| Rough Cut to Sizes .. .. | 2/8 | 3/5 | 3/10 | 4/9 | 6/4 | 7/4 | 9/– |
| Rubbed Smooth to sizes .. | 2/10 | 3/7 | 4/3 | 5/1 | 6/7 | 7/10 | 9/9 |
| Ditto Round Nosed .. .. | 2/11 | 3/8 | 4/5 | 5/4 | 7/– | 8/3 | 10/4 |
| Polished Face, sq. edges.. .. | 3/3 | 3/11 | 4/9 | 5/6 | 7/2 | 8/6 | 10/4 |
| Polished Face, Round Nosed .. | 3/7 | 4/5 | 5/4 | 5/11 | 8/– | 9/4 | 11/3 |

## WHITE SICILIAN MARBLE.

Under 7ft. long.

| Inches. | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 | 3½ | 4 |
|---|---|---|---|---|---|---|---|---|---|
| Rough Quarry Slabs | 1/5 | 1/9 | 2/1 | 2/4 | 3/6 | 4/2 | 4/9 | 5/9 | 6/– |
| Do. Cut to order .. | 1/8 | 2/2 | 2/8 | 2/11 | 3/11 | 5/1 | 5/4 | 6/10 | 7/10 |
| Rubbed Smooth, cut to order, square | 1/10 | 2/4 | 2/10 | 3/3 | 4/3 | 5/8 | 5/11 | 7/5 | 8/9 |
| Do. Round Nosed .. | 1/11 | 2/5 | 3/1 | 3/5 | 4/5 | 5/11 | 6/7 | 7/9 | 9/11 |
| Polished Face, sq. edges .. .. | 2/3 | 2/8 | 3/3 | 3/7 | 4/9 | 6/3 | 6/10 | 7/10 | 10/– |
| Polished Face, Round Nosed .. | 2/4 | 2/11 | 3/7 | 3/10 | 5/1 | 6/7 | 7/5 | 9/3 | 11/– |

## EXTRAS.

7 to 8ft., 3d. ; 8 to 9ft., 6d. ; 9 to 10ft., 1/– ; per super. 1in. thick.
Slabs under 12in. and over 9in., reckoned 1 ft. wide ; under 9in., and over 6in., reckoned 9in. wide ; under 6in. and over 3in., reckoned 6in. wd.

## LABOUR—EXTRA WORK ON MARBLE—TRADE PRICE.

| | White Sicilian. | Rouge & St. Annes |
|---|---|---|
| **Cutting—** | | |
| Basin holes, 1 round, 4/2; oval, 7/9 .. .. | 5 3 | 9 3 |
| Soap Dishes, 2/9 ; tap holes, 1/9, notches 1/9 | 4 3 | 2 3 |
| Mortice Holes, round 1/– ; square, 1/9 .. .. | 1 6 | 2 6 |
| Rebates, 1/– per foot run .. .. .. | 1 6 | |
| Joggles, 1/9 per foot run .. .. .. .. | 2 3 | |
| Round Corners, each 8d. .. .. .. .. | 1 0 | |

**Moulding and Polishing—**

Fluted edge, 1/– to 1/9 per foot run.
2in. Moulding and Scotia, 2/– to 2/6 per foot run.
Round-nosed Edge, 6d. to 1/– per foot run.
Rubbed Square Edge for Jointing, from 2d. to 4d. per lineal ft.
Polishing, one face, per super ft., 6d. to 8d.
Polishing, two faces, 1/– to 1/4 per super. foot

## MARBLE AND SLATE STEPS.

**Verandah Nosings and Steps. Stock Sizes.**

| | 12 x 1 | 12 x 1¼ | 12 x 1½ |
|---|---|---|---|
| Sicilian Marble, per foot run .. .. | 2/– | 2/6 | 3/9 |
| Slate, per foot run .. .. .. | 1/6 | 1/9 | 2/– |

Slate, 12 x 2in. thick, 2/6 per foot run.

### LABOUR INCLUDING BED.

**Labour** —**Fixing** Verandah Nosings, including bed, per 6ft., 3d. to 6d.
Ditto. Steps and Risers, up to 4ft. long, per step, 2/– to 2/6
Ditto Marble Mantels, including Plaster of Paris, each, from 5/–

**Laying Tiles**—

**Laying** ¾in. Tiles, black or white, 12in. sq., laid in cement, 3/– sq. yd.
Ditto do. do. 8in. sq. do. 4/– sq. yd.

**Facing Wall Work**—

Ditto ¾in. **Facing** Walls, setting, including cement and pointing, from 2/– to 3/– sq. yd.
Ditto Fixing Dado Mouldings, 3in., per foot run, 3d.
Ditto Skirtings to bathrooms, 6in. x ¾in., per foot run, 2½d.

Marble mason's wages, 1/1½ per hour—

| | | |
|---|---|---|
| Sawing only, per sup. foot .. .. .. .. .. | 1 | 0 |
| Plain faced and sanding, per sup. foot .. .. .. .. | 1 | 8 |
| Plain faced and polishing, per super. foot .. .. .. | 2 | 0 |
| Copper Clamps, letting in and fixing, each .. .. .. | 1 | 3 |

### Chimney Pieces in the Cities.

| | £ s. d. | £ s. d. |
|---|---|---|
| Sicilian White Marble, from .. .. .. | 1 15 0 to | 10 0 0 |
| St. Anne's Marble do. .. .. .. | 1 15 0 to | 13 0 0 |
| Marble Fenders, various .. .. .. | 1 10 0 to | 6 0 0 |

### GRANITE AND MARBLE MASONS' UNION (MONUMENTAL) RULES 1904.

| | | |
|---|---|---|
| Wages, Masons and Fixers, per 8 hours .. .. .. .. | 9 | 0 |
| Labourers .. .. .. .. .. .. .. | 7 | 0 |
| Carvers and letter cutters .. .. .. .. .. | 11 | 0 |

### Piecework Prices (Minimum).

| | |
|---|---|
| Lettering Freestone, cutting and painting, per 100 letters .. | 12/– |
| Marble cutting and loaded, per 12 letters .. .. .. | 3/6 |
| Ditto, 1-in. letters, cut only, per 12 letters .. .. .. | 4/– |
| Granite, cut and gilded, per 12 letters .. .. .. .. | 6/– |

# CEMENT.

## PORTLAND CEMENT.

PORTLAND CEMENT manufacturers in the States produce a cement that will now compare favourably with any European make, and which is up to the standard of tests required for best cements.

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The making of Cement from the raw materials—limestone, clay and shale—together with its intricate tests, are matters for the manufacturer and the civil engineer. But a few remarks on how to use it so as to get the best results, may be useful. All good cements are exceedingly fine and heavy, and of a bluish grey colour.

*Extract from "* ***Facts and Figures*** *" regarding the use of Concrete. Published by the Commonwealth Portland Cement Co.*

Slow setting cement is preferable to quick-setting cement for all general purposes.

**Cement Mortar.**—The cement and clean sharp sand, not too fine, should be thoroughly mixed in a dry state.

Cement mortar of one part of cement and two parts of sand is used when a high degree of strength and density is necessary, *e.g.*, for machinery foundations, damp cellars, etc., but for mortar for masonry, plastering, and general purposes, one part cement to three parts of sand is a suitable mixture.

Cement will bear a larger admixture of sand than three to one, but as a larger proportion of sand reduces the plasticity, a small addition of lime is advisable in such instances.

**Cement Plastering** should not come in contact with wood, unless protected by tar paper, as otherwise the woodwork swells by absorption of water from the cement mortar, leading to cracking of the cement.

A coating of cement and a small proportion of sand may be applied for protecting ironwork from the effects of steam and gas from engines.

Salt water should not be used for stucco work, or for any work in stables, etc., exposed to the effect of ammonia.

All cement mortar or concrete should be used as quickly as possible. Set or hardened cement mortar or concrete is quite useless. Its initial "set" should not be disturbed.

**Cement Lime Mortar.**—This class of mortar is as yet far too seldom used. The mixture of 1 part cement, 1½ parts lime, and from 3 to 10 parts of sand, gives a mortar of great strength at a low cost.

**Cement concrete.**—The cement and the aggregates (sand, gravel, and stone) should first be thoroughly mixed in the dry state, and then again when moistened with water.

Care should be taken to prevent the quick-drying of concrete by protecting it from the direct rays of the sun and sprinkling it from time to time with water.

**The best proportions** for concrete depend upon local conditions, and should be chosen on the basis of experience and experiment, in accordance with the available materials.

For general purposes a mixture of 1 part cement, 3 parts sand, and 6 parts of broken stone or bricks, will produce good concrete.

All concrete should be carefully rammed.

A surplus of water should be avoided, as otherwise the strength and the density of the concrete is affected. The proportion of water is correct if only after thorough ramming the concrete liquid appears on the surface.

When placing a second layer of concrete, it is advisable to do so before the first is set; otherwise the first layer should be scratched, cleaned and wetted for securing a firm bond.

**Concrete Blocks.**—When moulding these, the operation should be continuous, and care is necessary to completely and tightly fill in the mould. Pork fat prevents the concrete adhering to the mould. After 24 hours the mould can be carefully removed. The casting must then be protected against sun and draught, and kept wet for some days.

**Cement work** should never be applied on dry or absorbent surfaces, unless those surfaces be previously wetted, and when completed must be kept moist for some time to produce the greatest strength and to avoid shrinkage and cracking.

**The colour of cement work** may be influenced at will by choosing the colour of the admixture. White sand or marble dust, f.i., gives the finished work a lighter tint than ordinary sand.

Coloring matter may also be added to the mixture, but only such materials should be used which resist alkaline reaction.

**Other coloring materials** used are peroxide of iron, ultramarine, and lampblack. These materials must be well mixed with the cement before water is added.

**Cement concrete** must first be thoroughly dry and hard before paint is applied. It is advantageous to first put on a coat or two of water glass in four parts of water; when dry apply the paint.

**Cement, iron, or steel,** when exposed to the same temperature, expand at practically the same ratio; there need, therefore, be no fear of dislocation—cement protects iron as much against fire as against rust.

**Cement** is unquestionably the most fireproof material; whilst wood burns, stone splits, and iron twists, cement resists without injury the highest temperature.

The gross weight per standard cask of Portland Cement is 400lbs.

The nett weight of 3 bags, or one standard cask of Portland Cement is 375lbs.

One cask of Portland Cement contains about 3½ cubic feet.

# CONCRETE.

In mixing Concrete it is just as important to select good stone, sand, and clean water as to choose a brand of cement. Experience proves that the most reliable stone is basalt, which, when machine-broken, contains the largest proportion of cubical, and the smallest proportion of bruised, cracked, or chipped stone ; has at least 75 per cent. of its weight over 1½inches in size ; and absorbs the least quantity of water.

**The amount of material** required for a cubic yard of concrete cannot be accurately ascertained without trial with the materials to be used. If a cubic yard of the coarse ballast or metal is first measured, the spaces can be filled up with fine sand or water, which can then be separated and measured.

**Stone or rich lime** concrete shrinks from 20 to 23 per cent.

**Cement concrete** from 23 to 27 per cent., compared with the loose dry materials used.

**Water required** in mixing a cubic yard of cement and sandstone concrete is from 40 to 50 gallons.

*Mem.*—Whenever difficult forms present themselves in buildings, such as entrances with semicircular arches, circular on plan, or with convex jambs, &c., it will be found that cement rammed concrete, including mould planking, is from one-half to one-third the cost of brickwork in cement.

GOOD MIXTURE FOR CONCRETE.

*Per Cubic Yard.*

20 cubic feet broken metal, 2½ gauge.
16 cubic feet Bluestone Screenings, 5/16in., and dust equal parts.
1 Cask of Cement.

ESTIMATE OF A CUBIC YARD OF CONCRETE.

| | |
|---|---|
| 18 cubic feet 2½in. ballast .. .. .. .. .. .. | |
| 9 cubic feet clean stone or gravel screenings .. .. .. | |
| 7 cubic feet sand .. .. .. .. .. .. .. | |
| 1 cask, or 4 cubic feet of loose Portland cement .. .. .. | |
| Labour in gauging, mixing, wheeling, filling and ramming, &c. .. | |
| Net cost .. .. | |

N.B.—This shows 27 per cent. waste or shrinkage.

## CONCRETE-MAKING MACHINERY.

PRICES.

**For Hand Power**—Built on wheels easily shifted. Power required, 1 to 2 men. Capacity 4 cubic yards per hour, £65.

**For Electric Motor Power.**—Capacity, 10 cubic yds. per hour. £135.

Ditto. do. Capacity 15 cubic yards per hour, £220.

**For Steam Power.**—Capacity, 10 cubic yds. per hour, £200.

Ditto do. Capacity, 20 cubic yds. per hour, £250. With boiler and engine, £475.

Ditto do. Capacity, 30 cubic yards per hour, £350. With engine and boiler, £610.

The 20 cubic yd. Machine is the size generally used.

## CONCRETE.

*Per cubic yard. Labour and Staging. Wages, 1/- per hour.*

| | s. | d. |
|---|---|---|
| Labour in mixing, wheeling, and casting lime concrete .. .. | 3 | 6 |
| Labour in gauging, mixing, wheeling, filling and ramming cement, sand, screenings and metal concrete—turned four times .. | 7 | 0 |
| Preparing deal casing for ditto at back of brickwork, add extra 1/- to 2/- | | |
| Plank runs and staging, add extra .. .. .. ..6d. to | 1 | 0 |
| Hand breaking brickbats or clinkers for concrete, to 2½in. gauge .. .. .. .. .. 2/6 to | 3 | 0 |
| Ditto Bluestone ditto .. .. .. .. 3/- to | 4 | 0 |
| Concreting platform or landing of staircase, &c., about 8in. thick, including shoring, boarding, ramming, and rendering, per super. yard .. .. .. .. .. .. .. | 6 | 0 |
| Ditto **Soffit of iron staircase,** not more than 12 inches thick, including shoring, boarding, ramming, and rendering, per super yard .. .. .. .. .. .. | 9 | 0 |

### Concreting Girders.

*Per super yard.*

| | | |
|---|---|---|
| Concreting 3 feet Face and Soffit of girders, up to 8in. thick, fine Bluestone, including labour, fixing, steel lathing, face and soffit mould boards, reckon from .. .. .. .. | 12 | 0 |

According to quantity and length of Girder.

### COKE CONCRETE, Per Cubic Yard.

Coke, 41lbs. per cubic ft., or 10 cwt. per cubic yard.

| | s. | d. |
|---|---|---|
| 27 cubic feet small coke or breeze .. .. .. .. .. | | |
| 12 cubic feet of sand or coke dust .. .. .. .. .. | | |
| 4 bags Portland cement .. .. .. .. .. .. | | |
| Labour in gauging, mixing, wheeling, and ramming .. .. | 7 | 0 |

Add for centering and haulage.

### CONCRETE WALLS, Per Cubic Yard.

| | | |
|---|---|---|
| 22 cubic feet spalls or clippings, 14 cubic feet sandstone with grit, mixed with three bush. Portland cement, and rammed in the moulds .. .. .. .. .. .. .. .. | 6 | 0 |
| Labour in gauging, mixing, wheeling, ramming, adjusting mould &c., per cubic yard .. .. .. .. .. 5/- to | 6 | 0 |

## CONCRETE.

### Summary of Prices.

**Current Prices.**—Cement, 11/– per cask ; sand, 3/6 per load ; Bluestone, 9/6 per cubic yard ; coke, 20/– per ton ; lime, 40/– per ton ; broken bricks, 5/– per load ; oregon, 15/– per 100 super ft.

**Wages.**—Bricklayers, 10/6 ; Carpenters, 10/– ; Labourers, 8/–.

| | per cubic yd. |
|---|---|
| Cement Concrete, foundations, 1, 2, and 5 parts, brick and sandstone | 1 9 0 |
| Ditto. do. 1, 2 and 5 parts, Bluestone | 1 12 0 |
| Lime and Cement Concrete foundations, brick and sandstone, 1, 1, 2 and 5 parts | 1 5 6 |
| Coke Concrete floors | 1 14 0 |
| Coke Arches on centering to floors, 1, 2 and 6 | 1 18 0 |
| Cement Concrete floors, 12in. thick, brick and sandstone | 1 9 0 |
| Ditto. do. including centering | 2 2 0 |
| Pier footings, up to 3ft. square | 1 17 6 |
| Concrete Walling, 2 ft. thick, cement 1, sandstone 5, sand 3 | 1 18 6 |
| Ditto do. 12 in., ditto. per yard superficial | 0 15 0 |
| Extra Timbering and Boarding, use and waste only, per yd. sup. | 0 1 6 |

**Roads and Floors.—Per Square Yard.**

| | |
|---|---|
| Bluestone Concrete, for roadways, &c., 6in. thick, per sq. yd. | 0 6 0 |
| 5, 2 and 1, Bluestone and River sand and cement, 12in. thick | 0 10 0 |
| Sandstone or broken-brick concrete for floor and hearths, 5in. thick | 0 4 0 |
| Concrete finishing coat, in cement mortar, ½in. thick, 3 to 1 | 0 1 6 |

**Fireproof Concrete Floors**, composed of Bluestone, broken bricks, coke or cinders, strengthened by interlaced iron bars or expanded steel network, and supported on or between rolled steel joists. *See* Re-inforced Concrete for systems. The extra cost is as follows :—

#### Labour.

| | | |
|---|---|---|
| Fixing expanded steel sheets in position, per sq. yd. | 0 | 6 to 1 0 |
| Cost of ditto. per table, from | 2 | 2 to 4 0 |
| Centering, *see* Index | 2 | 0 to 2 6 |
| | 4 | 8 to 7 6 |
| Iron rods or " Monier " system, fixed from | 2 | 6 to 4 6 |

Add for Rolled Joists and Haulage, per floor.

## CENTERING FOR CONCRETE.

All centering must be true and rigid and properly braced. All joints must be fairly tight, so as to prevent leakage of the liquid mass. Waterproofing with asphalt papers or paint can be done very quickly.

The design of centering for floors between beams should be so arranged that the slab form may be removed first, and then the sides of the beams, leaving the beams or girders supported for a long time.

Bevelled strips are used to finish column and beam corners, and "fox," or bevelled wedges between uprights support and ribs or bearers, to raise boards gradually to height desired, and loosen them when concrete has set sufficiently.

Where a watertight concrete is desired, mix in the first layer soft soap and alum, in the proportion of 2lbs. soft soap and 12lbs. alum, with 30 gallons of water per cubic yard of concrete. *See also* Index, for dampproof.

Framing for concrete walls, where practicable, should be secured by long bolts through the concrete till set. The holes made by bolts to be filled in afterwards.

### CIRCULAR CIRCULAR CENTERING.

To Petersham Reservoir.

| | | | |
|---|---|---|---|
| 3in. Segment Ribs, 20ft. span, radiating, 4ft. 6in. rise, Arches in rings, 106ft. dia., spaced 4ft. 6in., outer edge of circle, covered with 1in. x 1in. lagging to withstand double twist in laying. | | | |
| Framing machine cut sweeps into ribs, and fixing ribs in position on supporting frame, 27 ft. high, 12 ribs cost labour, making and fixing .. .. .. .. | £10 | 0 | 0 |
| Add price of materials and mill cutting .. .. .. =22/- each. | 3 | 16 | 0 |
| Labour—Laying down curved lagging, 1in. x 1in. and planing edges level to receive concrete, labor only | per square 0 | 12 | 0 |
| Nails .. .. .. .. .. .. .. | 0 | 4 | 0 |
| Add price of Oregon lagging.. .. .. .. .. | 1 | 0 | 0 |
| Net cost per square .. | 1 | 16 | 0 |

Cost of supporting frame for ribs and lagging, striking centering at completion, and cartage to be added.

### CENTERING FOR CONCRETE FLOORS.

Centering for re-inforced concrete floors, from 2/- to 2/6 sq. yd.

**One Cubic Yard Concrete**

Will cover 12 sq. yards 3 inches thick.
Will cover 9 sq. yards 4 inches thick.
Will cover 7 sq. yards 5 inches thick.
Will cover 6 sq. yards 6 inches thick.

# RE-INFORCED CONCRETE.

Re-inforced Concrete is now an important factor in Modern Building construction, and excels by its indestructible nature any stone or brick masonry.

Some of the most striking and interesting uses of re-inforced concrete outside buildings, are its introduction to chimneys, lighthouses, dams, viaducts, bridges, septic tanks, &c.

A short description of the principal systems of re-inforcing introduced to the Commonwealth States, together with prices, so far as I have been able to obtain them by the courtesy of those interested, are appended.

**Monier, Re-inforced Concrete, Armoured Concrete, Ferro Concrete,** and **Concrete Steel,** are all used to denote systems of strengthening concrete in regard to tensile capacity, by embedding in it iron or steel members of special forms or according to arranged methods.

**Portland Cement Concrete,** when used to take compressive stresses only, has a well understood and easily demonstrated strength, but its relative value when called upon to bear tensile stresses is very small, practically less than one-tenth.

By the use of **iron or steel,** so placed as to supply this deficiency, and bring the capacity in tension into equilibrium with the capacity in compression ; a given depth of concrete on a floor or beam is consequently increased in value by approximately TEN TIMES.

Many different systems of reinforcement have been introduced during the past few years, some simply and easily operated by the general contractor, and others requiring the expert manipulation of the specialist. The systems mostly favoured up to the present time in the Australian States are " Monier " and " Expanded Steel," and framing of T and angle iron, bolted at intersections.

**Indented Steel Bar Reinforcement Co.,** of London, have a colonial agent in Sydney. Under the American designation of " Johnson," or " Corrugated " Bar it was awarded the gold medal at the St. Louis Exhibition, 1904, and at the Lewis and Clark Exhibition, 1905.

The placement of these bars (which range from ¼in. square to 1¼in. square) is made according to calculated tables published, and special prices and designs for different works must be obtained.

**Expanded Steel** is made in several sizes of mesh and thicknesses of sheets, and is adopted for a great variety of purposes, but for the reinforcement of concrete, the 3in. mesh, of suitable size strands for the strength required, is generally used. This is manufactured in sheets from 8 feet to 16 feet long by 4 feet to 8 feet wide, and in floors is laid in the largest convenient sized sheets for the purpose ; but for foundations or other special requirements, the agents supply cut to sizes.

### Test of Concrete.

Extract from the *N.S.W. Contract Reporter*, Feb. 19th, 1907 :—

" The main girders of rolled steel beams are about 17 feet apart, and are supported by steel stanchions at 14 feet centres. By an ingenious device of steel cradling, the actual bearing spans have been reduced to 15 feet, which, however, is the longest clear span yet attempted in this city.

" The architects, Messrs. Robertson and Marks, have, during the past few days, had a most satisfactory testing of one of the bays. The portion of the floor placed under test has been laid nine weeks, and was loaded with bricks to 350lbs. per square foot, the loading being allowed to remain for four days, when the total deflection was but one-fourth of an inch. On removing the load the floor resumed its normal position. The floor was designed for a working load of 1½ cwts. per square foot.

" The concrete was composed of 4½ parts well screened furnace ashes, with about 25 per cent. of the fine grit retained and one part Portland cement, and the expanded steel No. 62, 3in. mesh, strands 5/16in. x 3/16in."

Other important uses for expanded steel, besides the strengthening of floors, are as under :—

For **twisted surfaces, suspended stairways, groined arches, domed roofs, sewer pipes, aqueducts, wells, tanks, lighthouse erection,** and many other forms of construction where lightness and strength are required.

A reinforced sea wall of concrete erected at Colaba for the Bombay and Baroda Railway Co., is 180 feet long by 7 ft. 9in. at the base, and 4 ft. at the top.

The design is simplicity itself, being a solid mass of concrete with sheets of Expanded Steel embedded in and running right through the length of the wall parallel with the faces. It was built to replace the old masonry wall, which was washed away during a monsoon, although 10 ft. thick at the base, and tapered to 6 ft. at the top.

In Singapore No. 10 Expanded Steel is being used in all the culverts on the local railway extension with thoroughly satisfactory results, while the dome of the new Queen Victoria Memorial Hall has been lined with Expanded Metal lathing and plaster.

### Kahn Bar System.

Another system, using Kahn's Patent Trussed Steel Bars, with cut flanges bent to angle required, introduced by the Trussed Concrete Steel Co. of Detroit and London. The special feature of this is that the design of the bar provides a rigid reinforcement to take the shearing stresses.

It is particularly adapted for columns, beams, bridges and culverts. The Australian Agents are also the agents for Expanded Steel and use both materials in their designs. Detailed prices cannot be quoted for the Kahn bars, as each work has to be specially planned and set out by experts. *See* agent's advertisement page.

## EXPANDED METAL FOR CONCRETE FLOORS AND FOOTINGS.

It will always be desirable to get special quotations for each requirement. The present prices of the usual grades stocked in Sydney and Melbourne are as under. *See* agent's advertisement page.

**For Floors,** about 5 per cent., and for Foundations about 12½ per cent. must be allowed extra for laps of sheets.

### SUSPENDED FLOORS.

Labour—Fixing sheets in position, per sq. yard .. 6d. to 1/–

Centering for concrete, per sq. yard .. .. .. 2/– to 2/6

When introducing the metal into floors, the following strands are generally used, being based on the proportion of metal to thickness of concrete; at least ½ per cent. metal to concrete. Double layers are employed if required.

**Sizes approved of—**

No. 9 of 3in. mesh for 3in. concrete.
8 of 3in. mesh for 4in. concrete.
10 of 3in. mesh for 6in. concrete.
62 of 3in. mesh for 8in. concrete.
30 of 3in. mesh for 9in. concrete.

### EXPANDED STEEL DIAMOND MESH.

### NET PRICE.

CUT TO WIDTH FOR FOUNDATIONS AT PER YARD RUN.

| 3in. Mesh. | No. 30 | No. 62. | No. 10. | No. 8. | No. 9. |
|---|---|---|---|---|---|
| Strand .. | ⅜ x 3/16 | 5/16 x 3/16 | ¼ x 3/16 | ¼ x ⅛ | 3/16 x ⅛ |
| Weight per yd. .. | 16lbs. | 12½lbs. | 11lbs. | 8lbs. | 6lbs. |
| Width 3 | Stk. 5.3 | 4.6 | 4.0 | 3.3 | 2.8 |
| 2.9 | Stk. 5.0 | 4.3 | 3.9 | 3.0 | 2.6 |
| 2.6 | 4.6 | 3.11 | 3.6 | 2.9 | 2.4 |
| 2.3 | 4.2 | 3.8 | 3.3 | 2.7 | 2.2 |
| 2.0 | 3.9 | 3.4 | 2.10 | 2.4 | 2.0 |
| 1.9 | 3.4 | 3.0 | 2.7 | 2.1 | 1.10 |
| 1.6 | 2.11 | 2.8 | 2.3 | 1.10 | 1.8 |
| 1.3 | 2.5 | 2.2 | 1.11 | 1.7 | 1.5 |
| 1.0 | 2.0 | 1.9 | 1.7 | 1.3 | 1.2 |

Stock sheets from 16ft. x 6ft. to 8ft. x 4ft. per yard super. For smaller Meshes and Strands *see* PLASTERER.

All junctions of sheets must lap one full mesh (8in.), and at intersecting walls must cross completely. The metal should be laid about 2in. from bottom of concrete foundation, thoroughly embedded, and the concrete well rammed or trodden down.

# MONIER PATENT REINFORCEMENT.

## BRIDGE CYLINDERS, PILES, &c.

Manufactured by GUMMOW, FORREST & CO., LTD.

Delivered within 5 miles of Factory, Alexandria.

| Approximate Weight per foot run. | | | Inside Diameter. | Nett Price per lineal foot. | | |
|---|---|---|---|---|---|---|
| Cwt. | Qrs. | Llbs. | | £ | s. | d. |
| 2 | 3 | 8 | 3ft. 6in. .. .. | 1 | 10 | 0 |
| 3 | 1 | 18 | 4ft. 0in. .. .. | 2 | 0 | 0 |
| 4 | 0 | 12 | 4ft. 6in. .. .. | 2 | 10 | 0 |
| 4 | 3 | 3 | 5ft. 0in. .. .. | 3 | 0 | 0 |
| 5 | 2 | 1 | 5ft. 6in. .. .. | 3 | 10 | 0 |
| 6 | 1 | 9 | 6ft. 0in. .. .. | 4 | 0 | 0 |

Including Fishplates, &c., for connections.

## PILE ARMOUR.

| Cwt. | Qrs. | Lbs. | | £ | s. | d. |
|---|---|---|---|---|---|---|
| 0 | 2 | 13 | 1ft. 6in. .. .. | 0 | 3 | 6 |
| 0 | 3 | 4 | 1ft. 9in. .. .. | 0 | 5 | 0 |

Including Joint Netting, &c., for connections.

## MONIER PLATES.

FOR COVERING CULVERTS, STORMWATER CHANNELS, SEWERS, &c.

NETT PRICES.

COVERING TO FORM FOOTPATHS, FLOORS OF VERANDAHS, &c.

Top surface specially finished.

| Clear Span between Supports .. .. | 2′0″ | 2′6″ | 3′0″ | 3′6″ | 4′0″ | 4′6″ | 5′0″ | 6′0″ | 7′0″ |
|---|---|---|---|---|---|---|---|---|---|
| Thickness of Plate .. | 2″ | 2″ | 2″ | 2¼″ | 2½″ | 2¾″ | 3″ | 3¼″ | 3″ |
| Price per foot run .. | 2/9 | 3/3 | 3/9 | 4/6 | 5/3 | 6/– | 7/– | 8/6 | 10/3 |

COVERING FOR PASSENGER TRAFFIC.

With filling up to 4 feet in height over same.

| Clear Span between Supports .. .. | 2′0″ | 2′6″ | 3′0″ | 3′6″ | 4′0″ | 4′6″ | 5′0″ | 6′0″ | 7′0″ |
|---|---|---|---|---|---|---|---|---|---|
| Thickness of Plate .. | 2″ | 2½″ | 3″ | 3¼″ | 3½″ | 4″ | 4¼″ | 5″ | 5¾″ |
| Price per foot run .. | 2/6 | 3/3 | 4/3 | 5/– | 6/– | 7/– | 8/3 | 10/9 | 13/6 |

COVERING LIGHT TRAFFIC (1 Ton per Wheel.)

With filling over Covering of not less than 12 inches in depth.

| Clear Span between Supports .. | 2′0″ | 2′6″ | 3′0″ | 3′6″ | 4′0″ | 4′6″ | 5′0″ | 6′0″ | 7′0″ |
|---|---|---|---|---|---|---|---|---|---|
| Thickness of Plate .. | 3″ | 3½″ | 4″ | 4½″ | 4¾″ | 5¼″ | 5½″ | 6″ | 6½″ |
| Price per foot run .. | 3/– | 4/– | 5/3 | 6/6 | 7/6 | 8/9 | 10/– | 12/9 | 15/6 |

COVERING TO CARRY HEAVY TRAFFIC (2 Tons per Wheel).

With filling over Covering of not less than 12 inches in depth.

| Clear Span between Supports .. | 2′0″ | 2′6″ | 3′0″ | 3′6″ | 4′0″ | 4′6″ | 5′0″ | 6′0″ | 7′0″ |
|---|---|---|---|---|---|---|---|---|---|
| Thickness of Plate .. | 4″ | 4½″ | 5¼″ | 5¾″ | 6¼″ | 6¾″ | 7¼″ built in situ | | |
| Price per foot run .. | 4/– | 5/3 | 6/6 | 7/9 | 9/3 | 10/9 | 12/6 | | |

T BARS AND ⌋ IRON REINFORCEMENT.

## CONCRETE CHIMNEYS.

Weber Patent.

*Extract from Pamphlet.*

One of the most interesting uses of re-inforced concrete is its introduction into the construction of large chimneys. The chimney itself consists of two distinct parts, the lower double shell part and the single shell part above, which are divided where the offset is to be seen.

The dimensions of these shells are different, the inside shell being with a very few exceptions 4in. thick, while the thickness of the outer shell is depending upon the height of the chimney and varying between 6in. and 12in. In chimneys up to 160ft. in height, 6in. is the rule.

The thickness of the single shell is 5in. to 9in.

For common steam boiler use, the double shell part is carried 30 to 40 ft. above the bottom of the smoke bridge.

Between the two shells in the lower part there is a circular air space of 4in. width.

The inner shell, which has free space for expansion and contraction in every direction, shields the outer shell against the direct effect of the heat. The outer shell which takes up all the bending forces caused by wind pressure, etc., again protects the inner shell against the effects of the weather and temperature, thus preventing sudden cooling of same, and cracks which might be the result.

The great advantages claimed are **lightness of weight** and **economy of space.** The ground pressure is from one-fifth to one-third that of a brick chimney ; and they require from one-fourth to one-third the area of a brick chimney of the same dimensions of flue and height.

*Examples* : A chimney of this type was erected last year at Butte, Mon., U.S.A., 352 feet high, with a flue diameter of 18 feet ; base 42ft. 6in., square ; weight 2072 tons. Victoria Docks Chimney (1906)—Similar construction, for sugar refinery, 261 feet high ; 20 feet flue ; and 25 ft. square base ; erected to withstand wind pressure of 110 miles per hour. Knight, Beven & Sturges, re-inforced chimney (1907), 247 feet x 8 feet 6in. flue ; 18 feet sq. base ; weight 868 tons.

A chimney 200 ft. above ground level, 13 feet diameter flue at top, was erected in 60 days. Price about 20 per cent. cheaper than brick in cities. *See* Representative Agent, Elliott & McLean, for further particulars.

# BALLAST AND METAL.

*Kiama Bluestone Machine-broken Metal, delivered on Wharf or Rail, Sydney.*

| | cub. yd. | Ton of 24 cub. ft. |
|---|---|---|
| ¼-in. Ballast Screenings, including dust .. | 9 6 | 8 6 |
| ¾, 1½, 2½ gauges .. .. .. .. | 9 6 | 8 6 |

On Wharf, Port Jackson, including wharf dues.
(See advt., page 29.)

| | per ton. |
|---|---|
| Kiama Basalt Road Metal, all gauges. On trucks Kiama, Railway weights .. .. .. .. .. .. | 4 6 |
| **Melbourne Bluestone,** all gauges, delivered in Melbourne on rail .. .. .. 6 6 | 5 6 |
| **Nepean River** Broken Metal and Screenings, 2½, 2, 1½in. gauges, per ton of 25 cubic ft. .. .. .. .. | 8 6 |
| Ditto No. 1 Screenings, per ton of 28 cubic ft. .. .. .. | 8 6 |
| Ditto No. 2 Screenings, per ton of 22 cubic ft. .. .. .. | 8 6 |
| **White** (quartz) **Metal,** from Five Dock, 2½in. gauge delivered in Newtown, (about 3½ miles lead) 10 0 | 8 9 |
| Broken (earthen) pipes for concrete .. .. 4 0 | 3 6 |
| Waste bricks or clinkers from brick kilns .. 3 6 | 3 0 |

## RIVER SAND AND GRAVEL.

In Trucks at Emu Plains.

| | s. d. |
|---|---|
| Grit, per ton .. .. .. .. .. .. .. .. | 3 9 |
| Screened Sand, per ton .. .. .. .. .. .. | 2 9 |
| Fine and Ordinary Sand, per ton .. .. .. .. .. | 2 3 |
| 2in. Ordinary Gravel, per ton .. .. .. .. .. | 3 3 |
| Ordinary Gravel, per ton .. .. .. .. .. .. | 2 9 |

At Alexandria or Darling Island.

| | |
|---|---|
| Grit, per ton .. .. .. .. .. .. .. .. | 6 5 |
| Screened Sand, per ton .. .. .. .. .. .. | 5 5 |
| Fine and Ordinary Sand, per ton .. .. .. .. .. | 4 11 |
| 2in. Ordinary Gravel, per ton .. .. .. .. .. | 5 11 |
| Ordinary Gravel, per ton .. .. .. .. .. .. | 5 5 |

## HAND-BROKEN ROAD METAL.

Labour only, per Cubic Yard.

Wages of Stonebreaker, 1/– per hour.

| | s. d. |
|---|---|
| Bluestone or trap rock, broken to a 2½in. ring gauge .. .. | 3 6 |
| White metal .. .. .. .. .. .. .. .. | 2 6 |
| If hard sandstone, gritstone, brick or quartz .. .. .. | 2 3 |
| Wheeling and spreading within 20 lineal yards .. .. .. | 1 6 |

**Stonebreaking machines** will break from 6 cubic yards of 2½in. ring gauge bluestone per hour, with two men to supply the stone, &c., at about 1/–.

If *spalls* or small rubble can be obtained at a quarry within a mile of the machine, 2½in. ring gauge bluestone metal may be supplied and loaded into trucks or drays at a cost of 3/– per cubic yard.

Hope's Stone-breaking Machine, requiring 8–horse power engine, will break, on an average, 6 cubic yards of 2½in. metal per hour, if well supplied with spalls. Its superiority is due mainly to its patent cubing jaws, fitted with Hadfield's manganese steel.

In measuring ballasting for railways or tramways, the sleepers should be deducted for *net measure.*

Weight of Rubble Road Metal, Etc.

| | p. cu. yd. cwt. | cu. feet. per ton. |
|---|---|---|
| Granite rubble | 30 | 18 |
| Bluestone rubble | 28 | 19 |
| Sandstone rubble | 28 | 19 |
| 2½in. Bluestone metal | 26 | 24–26 |
| 2in. Bluestone metal | 25 | 25–27 |
| 2½in. Sandstone metal | 24 | 22½ |
| 2in. Sandstone metal | 23 | 22 |
| Sand or fine gravel ballast | 22½ | 24 |
| 1in. Bluestone Screenings | 23 | 27–28 |
| Small Coke or Breeze | 12 | 41 |
| Shingle or Old Mortar | 21½ | 25 |
| Mortar, new | 19 | 28 |

## CLAY PUDDLE.

*Per cubic yard.*

| Wages of labourer, 1/– per hour, with use of tools. | s. | d. |
|---|---|---|
| Excavating for clay, getting, filling, and wheeling, one stage, not exceeding 20 yards | 2 | 3 |
| Chopping and watering for tempering | 1 | 0 |
| Tempering after clay has been soaked | 1 | 3 |
| * Filling, wheeling one stage, tipping to place required, and treading | 1 | 6 |
| | 5 | 9 |
| If unbearing is required to get the clay, add per foot in depth to be removed | 0 | 6 |

When the clay is tipped into, and can be tempered in the place required, leave out item marked thus*

Clay puddle, when properly prepared should be similar to brick earth ready for moulding.

The use of tar concrete, coke dust and tar, mixed together in thin layers, would form an excellent substitute for puddle where clay is scarce. It would also save excavation, as two inches of this stuff would be ample, instead of nine inches of clay.

# ASPHALTE.

**Seyssel** asphalte is made from a natural calcareous bitumen, found at Seyssel, near Pyrmont, department of l'Aix ; and "contains 90 parts of carbonate of lime to about 10 parts of bitumen" ; this is improved by the addition of tar or pitch by the Patentee.

The calcareous asphalte rock of Val de Travers, in the Canton of Neufchatel, in Normandy, contains 20 per cent. bitumen.

Bitumen, naturally combined with calcareous earth, forms a compact slightly elastic substance which is as durable as granite, *but no artificial mixture of coal tar and calcareous earth, carbonate of lime, or chalk has ever been produced at all approaching the natural asphaltes in durability.* This is partly due to the difficulty of imitating the natural combination in mixing, but chiefly to the fact of the natural bitumen, being a kind of mineral tar, which will sustain 170 deg. of heat without injury, whereas asphalte made from coal (vegetable) tar, becomes soft at 115 degrees of heat.

Some Asphalt papers are made by saturating coarse packing paper with kerosene oil refuse and Asphaltum. Two-ply paper will make a fair roofiing felt. Asphalte paint will cement wood to wood or to asphalte.

Pure Bitumen is one of the oldest substances known as a waterproof material. It was employed in building ancient Babylon and Nineveh roof gardens, and for cementing the stones together, thousands of years ago, and this same bitumen, what there is of it, is in as good preservation to-day as when laid.

Tar and bluestone metal, with tar and bluestone screenings for the top of surface, is sometimes used for streets, but is very inferior to Asphalte.

**Pure Bitumen,** on wharf or rail, per ton, £8 2s. 6d.

**Special Blocks** for Sewerage Pipe Joints, mixture of coal-tar, bitumen, and bluestone dust, £7 0s. 0d.

## COST OF LAYING ASPHALT 1in. THICK.

Labour only.

| | s. d. | s. d. |
|---|---|---|
| Price for large surfaces, from .. .. .. | 1 2 to | 1 6 |
| **For Roofs,** about 200 sq. yds, and 40 to 50 ft. above pavement, from .. .. .. .. | 2 0 to | 2 6 |

# ASPHALTE, FLOORS, ROOFS, &c.

*Asphaltum Co.'s Supplies—Trade Prices, per super yard, Laid complete.*

## DAMPCOURSE.

| | Melbourne. | Sydney. |
|---|---|---|
| Horizontal Limmer (Rock) Asphalte ½in. thick .. | 5 0 | 5 0 |
| Ditto Trinidad (or Patent) Asphaltum ½in. thick | 6 0 | 4 0 |
| Ditto do. do. 3/8in. do. | 4 0 | 3 6 |
| Vertical do. do. (2 coats), ½in. do. | 7 0 | 4 0 |

Portable.—For portable in rolls, *see* advertisement page 5.

## ROOFS.

| | | |
|---|---|---|
| Limmer (rock) Asphalte, 1in. thick .. .. | 8 6 | 8 6 |
| Trinidad-Atzo Asphaltum, 1in. do. .. .. | 10 0 | 10 0 |
| Ditto (or Patent) Asphaltum, 1in. thick .. .. | | 8 0 |
| Ditto. do. do. ¾in. thick .. .. | | 7 0 |
| " Ideal," Patent (Arkilite), 2in. thick .. .. .. | 10 0 | 10 0 |

## FLOORS.

| | | |
|---|---|---|
| Limmer (rock) Asphalte, 1in. thick .. .. .. | 7 6 | 7 6 |
| Ditto do. do. ¾in. thick .. .. .. .. | 6 6 | 6 6 |
| Trinidad (or Patent) Asphaltum, 1in. thick .. .. | 9 0 | 7 0 |
| Ditto do. do. ¾in. do. .. .. .. .. | 8 0 | 6 0 |
| Ditto do. do. ½in. do. .. .. .. .. | 7 0 | 5 0 |

## PAVEMENTS.

| | | |
|---|---|---|
| Tiles, hexagonal (24 per yd.), 2in. do., per 100 .. .. | 45 0 | 30 0 |
| Pavement Blocks, 12 x 5 x 4 (22 per yd., per 100 .. | 60 0 | 44 0 |

Arkilite floors, nosings, steps, etc., see advertisement page 4.

Ægypto jointless sanitary flooring, see advertisement page, 4.

Paint, Asphaltum, 1 coat, 1/– ; 2 coats, 1/6 per sq. yard.

Ditto, 5 gallon drums, 7/6 per gallon.

Marine Glue (Patent Asphaltum Co.), black, in 56lb. tins, 10/6 each.

When the dampcourse is applied to the face of walls, it is applied in coats ¼in. thick. For further particulars, *see* Index and Advertisements.

## PAVINGS.

Laid Complete, per square yard.

| | | | |
|---|---|---|---|
| **Bluestone Cement Concrete,** 6in. thick, foundations, from .. | 6 | 0 |
| Blue Metal Screening, 1in. thick, from do. .. .. | 2 | 0 |
| **Asphalt Fillet,** 3 x 1, around basements or walls, per l. yd. .. | 0 | 6 |

### Silicate Paving.

| | | | |
|---|---|---|---|
| **Silicate Paving,** including concrete 3in. thick .. .. .. | 6 | 0 |
| Ditto „ „ 4in thick .. .. .. | 6 | 9 |
| Ditto „ „ 6in. thick .. .. .. | 8 | 0 |

## TARRED PAVEMENTS.

Bluestone Metal, 3in. thick, composed of 1¼ gauge metal, with 1in. top dressing of 3/8 screenings, and 20 per cent. dust, mixed in the proportion of 25 gallons of tar to 1 cubic yard screenings.

Rolled and sanded, per super yard, 2/–.

Material necessary for 10 sq. yds., 3in. thick, 14 gallons of Tar to 1 ton of metal and screenings, mixed to 90 degrees is sufficient.

| | | | |
|---|---|---|---|
| **Tar Concrete or composition pavement,** viz., 2½ins. of 2-in. bluestone metal, foundation, 1 in. coarse, and ½in. fine screenings, the whole mixed with tar, and dusted over with bluestone dust. | 4in. thick .. | 2 | 6 |
| | 5in. thick .. | 3 | 3 |
| | 6in. thick .. | 4 | 0 |
| Painting with hot tar and sand .. .. .. .. | 0 | 2 |
| 1in. Tar and Coke Top-dressing and Rolling .. .. .. | 0 | 3 |
| Tar per gallon at Gas Works .. .. .. .. .. | 0 | 4 |
| Tar concrete, 3in. of 2in. sandstone metal, covered with 1in. coke dust and tar and well rammed, per super yard .. | 1 | 6 |
| Tar concrete footpaths, with gravel foundation covered with coke dust and tar .. .. .. .. .. .. | 1 | 3 |
| Coke dust and tar, mixed for spreading, per ton .. .. | 6 | 0 |

N.B.—Tar required for 6in. tar concrete paving, viz., 3in. of 2in. metal, tarred after spreading, 2in. smaller metal mixed with tar, topped with 1 in. tar and coke dust, requires from 1¼ to 1½ gal. per super yard.

## WATERPROOF FELTS, PAPERS, AND MATERIAL ONLY.

Trinidad roofing felt, 66 per cent. Bitumen ; 34 per cent. coarse fibrid felt, is put up in rolls, 80 feet long by 32in. wide.

Per roll 2-ply weight 84lbs., price 28/–
3 „ 100lbs., price 35/–

## MALTHOID AND RUBEROID ROOFING FELTS.

In rolls 72 ft. long, 3 ft. wide.

| | ½-ply. | 1-ply. | 2-ply | 3-ply. |
|---|---|---|---|---|
| Ruberoid .. .. .. .. .. | 19/– | 22/– | 29/9 | 36/9 |
| Malthoid .. .. .. .. .. | 17/6 | 21/6 | 29/– | 36/– |
| Resistoid Roofing .. .. .. .. | 16/– | 20/– | 28/– | 34/– |

P. & B. Ready Roofing, gravelled, 32ft. x 40in. wide, per square 21/–

Ruberoid Cloth, 29in. wide, per yard 1/9.

Ruberoid Red or Brown Roofing, 72ft. x 36in. wide, covers 200 sq. ft., 38/–

## BUILDING WATERPROOF PAPERS.

Rolls, 336ft. x 3ft., cover 10 squares—1 ply, 15/–; 2-ply, 20/–; 3-ply, 2/–; and 4-ply, 36/–.

Vertical Dampcourse, 72ft. x 3ft. rolls, per square, 20/–

## DAMPCOURSES.

### HORIZONTAL.

**Slates and cement,** 2 courses in cement, laid, per sup. ft., 9d.

Ditto, Vertical, laid, per sup. ft., 1/–

**Glazed earthenware,** 1¾in. thick. *See* Brickmakers' Materials, bedded in cement.—For 4½in. walls, 6d. per foot run; 9in. walls, 9d.; 14in. walls, 1/–; 18in. walls, 1/6 per foot run.

Asphalt Dampcourses.—*See* page 85.

## DAMPCOURSE.

### RUBEROID AND MALTHOID DAMPCOURSE.

Material only, laying and waste, per roll, 1/6 extra.

| Width in inches .. | 4¾in. | 9½in. | 14in. | 18½in. | 23in. | 27½in. | 36in. |
|---|---|---|---|---|---|---|---|
| Price per roll of 72ft. .. | 5/9 | 11/6 | 16/6 | 21/– | 25/6 | 30/– | 36/– |
| Resistoid ditto. .. | 5/– | 10/– | 13/6 | 17/6 | 20/– | 24/– | 30/– |
| Per foot run, about | 1¼d. | 2d. | 2¾d. | 3¾d. | 4¼d. | 5½d. | 7d. |
| "Trinidad" Bitumen Dampcourse, material only.—*See* advt. p. 4 | | | | | | | |
| Rolls, 80ft, long .. | 5/6 | 11/– | 16/– | 20/– | 25/– | 29/– | 33/– |
| Callenders—Rolls, 24ft. | 3/– | 4/– | 6/– | 8/– | 10/– | — | 14/– |

**Stoniflex** Roofings, in rolls, 45ft. x 3ft. wide.—No. 1, 50lbs. weight, 12/6; No. 3, 24lbs., for linings, 5/6 per roll.

For Waterproof Compositions, &c., *see* Patent Paints.

## ROAD-MAKING.

Extracts from "ROAD-MAKING," by DUNCAN SALMON, M.I.C.E.

Macadamised roads require first of all a solid and drained foundation, and a surface rolled as soon as the broken metal is laid to uniform grades and slopes.

Rolling before traffic regulates the life of a road, as witness the quality of Melbourne and Brisbane roads where the above is the practice.

Top layers, 6 to 9in. thick of broken metal to a 2½in. gauge, with a good cementing material, or blinding of blue metal screening, or ironstone or clay, to keep the water from percolating, and softening the under structure.

Tarred metal roads and paths last longest. Ironstone Ridge Gravel found throughout the Australian states, contains clayey or other cementitious properties that bind well under pressure of traffic or otherwise. Note the comparatively little effect through heavy traffic of wool teams with narrow tyred wheels following the one track across these red ridges year after year, thus proving that foundation and drainage are the principal requirements of a good road.

For road construction, basalt or bluestone comes first with granite, quartz, schist, white metal, limestone and sandstone, hard quartz with ironstone bands, following in the order named.

The quarried basalt is preferable to river or creek gravel ballast, as it binds together better, having no smooth water worn surfaces to slip under pressure.

*See* Index Ballast and Metal, for prices.

## STREET PAVING, &c.

A perfect street paving must be sanitary, durable and economical, with a smooth and well-graded surface. Compressed rock asphalte lays claim to all these attributes.

It is sanitary and clean, as it produces no dust, therefore no mud, and as it is laid from kerb to kerb without joints, no water or filth can percolate through to foundations. A shower of rain washes the surface only, which dries again within fifteen minutes.

It is said to become further compressed and harder the greater the amount of traffic that passes over its surface, and consequently does not wear away by continual contact.

The life of an asphalte roadway naturally varies according to the conditions of traffic and climate.

The Val de Travers Asphalt Roadway, laid in Cheapside, London, in 1870, was not re-laid until eighteen years later, and there are instances in London, Paris, and Berlin where asphalte roadways have lasted for 30 years. The demand for good smooth roadways has increased the area of asphalte paving in Berlin alone, from 106,000 square metres in 1880, to 3,256,000 square metres in 1906.

**The cost** is from 7/6 per sq. yard for 1in. thick. The cost of foundation for above must be added according to requirements. *See* Asphaltum Co.'s advertisement.

## WOOD PAVEMENT.

"**Asphalte and wood-blocking** are the only two forms of permanent paving, and both are used in different quantities, according to the conditions for which they are required and the prevailing local circumstances."—Notes from "CITY SURVEYOR," 3rd April, 1907.

The best timbers for this purpose are Tallowwood, Blackbutt, Blue Gum, Red Gum, and Mahogany.

The are laid with a depth of 5″, the blocks being cut 9 x 5 x 3, 8 x 5 x 3, and 7 x 5 x 3.

The modern practice is to lay the blocks with close joints. 50 blocks cover a square yard.

The life of the pavement is about 16 years.

In the city streets the blocks are laid up on 6in. of concrete.

The total cost including excavation, concreting, woodpaving, and topdressing with tar and pea gravel is about 16/– to 17/6 per square yard in Sydney ; —*i.e.*, by contract for a fair area.

The cost of maintenance is practically nil for the first 10 years, after which a small sum is required annually for repairs.

The cost of top-dressing the blocks with distilled tar and pea gravel is about 25½d. per sq. yd., the dressing having a life of about 6 months.

It has been known for the past 40 years that it is not suitable for inclines over 1 in 20.

**Removing** old metal, etc. , from one-half of street to a depth of about 18in. (ballast 9in., metal 9in.), and keeping site in repair during wood paving of other half strength, per cubic yard .. 4 0

**Concrete,** *viz., viz.* : 24 Cubic feet of river gravel (not larger that 2½in. gauge) and coarse clean river sand to one cask of cement, Per cubic yard .. .. .. .. .. .. 35 0

**endering** up to ½in. thick, with 1/3 of cement to 2/3 of clean, sharp, river sand, per super yard .. .. .. .. .. 1 6

**Woodblocks**—20 per cent. 7in., 20 per cent. 8in., and 60 per cent. 9in. (by 5in. x 3in.) dipped in hot tar, laid with butt joints and topdressed with well-boiled tar, river sand, and small gravel, per super yard .. .. .. .. .. 10 0

**Bluestone or Trachyte** cube-setts, 6in. to 8in. x 7½in. to 14in. x 4in., laid with close joints on 2in. clean sharp river sand and well flushed up by sweeping with sand, per super yard. .. 15 0

## TARRED METAL ROADS

Not including foundation.

4½in. thick, graded and rolled and sanded—
3 cubic ft. of Bluestone metal, broken to a 2½in. gauge, mixed with 1 gallon of hot tar, 3in. thick ; ¾ tarred metal, 1in. thick ; tarred screenings, ½in. Price per sup. yard .. 3 0

3in. thick, in two courses, per super. yard .. .. .. 2 0

Top dressing, 1in. thick, rolled and sanded .. .. .. 1 0

Top dressing, ½in. thick, rolled and sanded .. .. .. 0 9

Painted with hot tar and screenings .. .. .. .. 0 3

Concrete Foundation to above .. .. .. .. .. 6 0

Excavation and Grading to be added.

# BRICKLAYER.

## MEASUREMENT.

**In measuring brickwork** all flues are to be measured as solid work below the roof, but above the roof (for labour only) the girt is taken by the thickness of brickwork round flue, and this multiplied by the height, including projections which are girted. Piers, pilasters, quoins, &c., are also girted for labour only.

The shortest method of reducing cubic feet to the standard thickness of 1½ brick, is to deduct one-ninth, or multiply by 8 and divide by 9.

To reduce 1 brick to 1½ brick walls, deduct one-third from the given area.

In measuring height of walls, the wall-plate is included for setting or allowed for separately.

**Footings.**—If the projection of the footing is in regular offsets, three or more courses high, the average dimension is sufficient ; otherwise each course must be taken separately.

Then take the walls above the footings to the ground story, each thickness story by story, to the top.

All additions, as chimney breasts &c., for each floor to be taken.

If any brickwork is carried up in cement, it can be allowed for and placed under a separate head.

Measure chimney shafts, the width, height, and thickness.

To measure the projections for cornices, courses to chimney shafts, &c., take the several lengths and multiply by their width, and the thickness beyond the face of the brickwork previously taken. Circular work is measured on the curve, in the centre of the wall, for very quick curves and otherwise by external face.

**The Deductions.**—Deduct all windows, doors, openings, &c., on each floor. It is recommended to take the width of the opening first, and then the height.

If the reveals are square, deduct in one dimension. If recessed, they must be taken in two or more.

**Facings** are measured by the square yard. Take the width of the walls to be faced, with all returns, and then the height, deducting any stone or cement cornices, plinths, facing, &c., out of such height ; also deduct windows or other openings. Keep moulded bricks separate.

Flat joint and tuck pointing are measured by the square yard.

Number all sash and door frames, bedded and pointed ; if over 28 feet superficial, keep separate in estimate.

Brick walls, if classified together according to their thickness, admit of a more equitable estimate being made than by the common method.

## MEMORANDUM.

### One rod of Brickwork contains

272 feet super, of 1½ brick, or 13½ inches in thickness.
408 feet super of 1 brick or 9 inches in thickness.
Or 11⅓ cub. yds., or 306 cub. ft. — 235 cub. ft. bricks, 71 cub. ft. mortar.

**Bricks.**—4080 bricks of 4 courses to 13 inches, or ordinary brickwork.

**Mortar.**—2 to 1, 48 bush. of sharp sand, and 24 bush. or 8 bags of stone lime.

Or 2⅔ loads of sharp sand and 6 barrels of Portland cement, or specified proportions.

**Water.**—200 gals. for mortar and 400 gals. for wet bricks — 600 gals. at 1/6 per 1000 gals — about 1/– per rod. Cement mortar only requires 162 gallons, or 3 hogsheads per rod.

**Weight.**—Bricks generally weigh 7½lbs. each, or not less than 3 tons per thousand, say 13 tons per rod, the mortar weighing about 3 tons at 24 cubic feet per ton. The rod of brickwork may therefore be considered to weigh about 16 tons, or about 28 cwt. per cubic yard.

A rod of reduced brickwork will require about 170 hods of mortar.
16 bricks to one foot of reduced brickwork.
7 bricks to one foot superficial of facing.
10 bricks to one foot superficial of gauged arches.

**Paving**—One yard superficial—
32 bricks, laid flat, to one yard superficial of paving.
44 bricks, on edge, to one yard, with ¼in. for joints.

### Tiles.

No. 13 of 10-inch square pavement tile to one yard super paving.

| | | | |
|---|---|---|---|
| 9 — 12-inch | do. | do. | do. |
| 16 — 9-inch | do. | do. | do. |
| 36 — 6-inch | do. | do. | do. |
| 72 — 4¼ x 4¼-inch | do. | do. | do. |
| 81 — 4-inch | do. | do. | do. |

A cubic yard of sand is twenty-three striked bushels.

### Super yards per rod.

79½ super yards — reduced rod of 4½ inch brickwork.
45⅓ super yards — one rod of 9 inch work.
30 2/9 super yards — one rod of 18inch work.
27 feet cube of mortar requires 9 bushels of lime and 1 yard of sand.
A bricklayer's hod will hold 20 bricks, or ½-bushel of mortar.
1728 cubic inches — 1 cubic foot. 46,656 cubic inches — 1 cubic yd.

**Labour.**—A good tradesman should lay per day of 8 hours—600 to 800 bricks, 9in. work, in cement, struck joint ; 800 to 1000 bricks, 14in. work, in mortar ; 500 picked face worked.

### To find the value of a rod of Brickwork.

| Contents. | £ | s. | d. |
|---|---|---|---|
| 4000 bricks, of 4 courses, equal 13ins. at per thousand | | | |
| $3\frac{1}{2}$ to 4 hogsheads of water, according to *fatness* of lime .. | | | |
| 18 bushels of lime, at per bushel .. .. .. | | | |
| 3 or 2 loads of sand as specified, 18 bushels per load .. | | | |
| lbs. hoop iron (if specified) .. .. .. .. | | | |
| " Labour only," as above .. .. .. .. .. | | | |
| Cost price per rod .. | | | |
| Add scaffolding, cartage and profit | | | |
| Contractors' price = | £ | | |

Having ascertained the price per rod as above, any alteration in the price of bricks can be allowed for at the rate of 4/– per rod for each shilling per 1000. The proportions of cement or lime can also be varied as required.

*Brickwork, Sydney, $\frac{1}{8}$ lime mortar—*

Bricks, £8 ; labor, £5 ; marble lime, 30/– ; sand, 3 loads or 54 bush., 12/– ; water laid on, 2/– ; net cost .. £15 4 0

*Faced with double pressed bricks—*

Add extra cost of 1333 bricks (6/– to 12/– per 100) for face bricks laid ornamentally to pattern in proportion to cutting and fitting.

If the brick facing or face bricks are measured separately, half the depth of the reveals are included in the measurement.

### Materials required for a Cubic Yard of Brickwork.

384 bricks 4 courses to the foot.
360 bricks 4 courses to 13 inches.
$1\frac{1}{2}$ bushels of cement or stone lime and 3 of sand, with joints averaging $\frac{3}{8}$in. thick.
1 bushel cement or stone lime and 2 of sand, with joints averaging $\frac{1}{4}$ inch thick.

Hoop Iron for Bonding, &c.

*Per lineal foot.*

| Gauge No. | Weight in lbs. | Width in inches. | Gauge No. | Weight in lbs. | Width in inches. |
|---|---|---|---|---|---|
| 13 | 0.62 | 2 | 16 1/16 | 0.26 | $1\frac{1}{2}$ |
| 14 | 0.47 | $1\frac{3}{4}$ | 17 | 0.21 | $1\frac{1}{8}$ |
| 15 | 0.36 | $1\frac{1}{2}$ | 18 | 0.16 | 1 |
| 18 | 0.34 | $1\frac{3}{8}$ | 19 | 0.12 | $0\frac{7}{8}$ |

**Brick beams in cement.**—on T iron lintels laid out flat may be safely used for square-headed openings, the iron lintels being supported until the cement sets. Wooden lintels should be avoided in first-class work as their shrinkage (especially if Colonial hardwood) often cause cracks in the walls. The extra cost is trifling.

| Prices of Material.—City Delivery. | £ | s. | d. |
|---|---|---|---|
| Common bricks, per 1000 | 1 | 18 | 0 |
| Face Bricks, O.K. | 3 | 4 | 0 |

Lime, per bushel, 1/8 ; sand, per load, 4/– ; cement, 11/– per cask.

Bricklayers' wages, 11/– ; labourers, 9/– per day.

| Contract Prices obtained. | per rod. | | |
|---|---|---|---|
| Brickwork, in mortar, including arches in cement | £16 | 15 | 0 |
| Ditto in cement | 18 | 15 | 0 |
| Brickwork in mortar, hollow walls and ties | 17 | 10 | 0 |
| Brickwork in cement | 19 | 10 | 0 |

*Extra to above.*

| | | | |
|---|---|---|---|
| Facing O.K. bricks, per square yard (or 67/6 per rod, 9in. work, extra.) | 0 | 1 | 6 |
| Facing Double Pressed bricks, per square yard | 0 | 4 | 6 |
| Struck joints, per square yard | 0 | 0 | 6 |
| Tuck Pointing, new work, including colouring, per sq. yd. | 0 | 3 | 0 |
| Ditto old work, ditto, and raking out, per sq. yd. | 0 | 3 | 6 |
| Galvanised Iron bond, per cwt. | 1 | 0 | 0 |

*Estimate of above Rod.*

| | | | |
|---|---|---|---|
| 4000 bricks, at 38/– | 7 | 12 | 0 |
| 18 bus. of lime, at 1/8 | 1 | 10 | 0 |
| 3 loads of sand, at 4/– | 0 | 12 | 0 |
| 1 bag of cement for arches | 0 | 4 | 6 |
| Water | 0 | 2 | 0 |
| Labour, 4000 at 22/– | 4 | 8 | 0 |
| | 14 | 8 | 6 |
| Add for cartage, scaffolding and profit | 2 | 6 | 6 |
| Openings not deducted | £16 | 15 | 0 |

**Example of Cost—Net.**

Brick wall, with piers and recessed panels, 8ft. apart, faced both sides with O.K. bricks ; length of wall 180 ft. x 5ft. 6in. x 1½ bricks :—

| | | | |
|---|---|---|---|
| Cost, 13,000 bricks, at 60/– | 39 | 0 | 0 |
| Labour, bricklayers, 370 hours at 1/4 = 24/13/– ; Labourers, 260 hours at 1/1½ = 14/12/– | 39 | 5 | 0 |
| 11 loads of Sand, 44/– ; 16 bags of lime, 64/– | 5 | 8 | 0 |
| About 3 rods 174ft. = net cost of wall | £83 | 13 | 0 |

### Labour and Scaffolding per rod, reduced.

| | £ | s. | d. |
|---|---|---|---|
| Brickwork, garden wall bond, two faces .. .. £6 to | 7 | 0 | 0 |
| Brickwork in circular tanks, culverts, cesspools or wells, ½-brick thick, including trammels and centres, from £7 to | 8 | 0 | 0 |
| Ditto, 1 brick or more in thickness, from .. .. £5 to | 6 | 0 | 0 |
| Brickwork in mortar for 4½in. walls .. .. .. £6 to | 7 | 0 | 0 |
| Ditto, do. for 9in. walls .. .. .. .. .. £4 to | 5 | 0 | 0 |
| Ditto, for 1½ brick walls .. .. .. £3 15s. to | 4 | 10 | 0 |
| Foundations or for walls, 2 or more bricks thick £3 10s. to | 4 | 0 | 0 |

### Extras.

| | | | |
|---|---|---|---|
| Add if worked fair on both sides, per sup. rod .. .. .. | 0 | 10 | 0 |
| Cavity walls .. .. .. .. .. .. .. | 0 | 15 | 0 |
| If in **cement** add one-sixth .. .. .. .. .. | | | |
| If old bricks with bats are used, add .. .. .. 9s. to | 0 | 10 | 0 |
| Taking down brickwork, cleaning and stacking bricks, per rod .. .. .. .. .. .. 16s. to | 1 | 2 | 0 |
| Ditto, per 1000 bricks .. .. .. .. .. 4s. to | 0 | 8 | 0 |

Add for mortar, cement or bricks, as per estimate.
The larger prices include flushing-up all joints.

### Labour and Scaffolding, per cubic yard.

| | £ | s. | d. |
|---|---|---|---|
| **Bridges, abutments, &c.,** not less than 1½ brick thick .. | 0 | 7 | 0 |
| **Arches,** large culverts, or Skew bridges .. .. .. | 0 | 7 | 0 |
| Ditto or culverts, 1 brick thick .. .. .. .. | 0 | 10 | 0 |
| Ditto or culverts, ½ brick thick .. .. .. .. .. | 0 | 12 | 6 |
| Ditto lining to sewers, ½ brick thick .. .. .. .. | 0 | 12 | 6 |
| Piers, small and lofty, 4 sides plumbed .. .. .. | 0 | 18 | 0 |
| Coppers, ovens, furnaces, cupolas, or ½ brick culverts 9/– to | 0 | 15 | 0 |
| **Factory Chimneys,** square, any height below 60ft. .. .. | 0 | 10 | 0 |
| Ditto, circular, any height, to 6ft. flue .. .. .. | 0 | 12 | 0 |
| Ditto, circular, over 6ft. to 12ft. flue .. .. .. .. | 0 | 8 | 0 |
| Ditto, octagon, any height, or church spires .. .. .. | 0 | 14 | 0 |
| **Brickwork in cement,** with wet bricks, for curved arches, circular on plan, per cubic yard, from 30/– to .. .. | 2 | 10 | 0 |

**Chimneys** more than 60ft. high, add one per cent. for every extra foot.
If built from the inside, deduct 15 per cent.
If in cement, add one-sixth to these items.

## GAUGED ARCHES.

**Labour, putty, and centering, per foot super.**

| | Cut and set. s. d. | Cut only. s. d. |
|---|---|---|
| Camber, semi or circular arches, rubbed and set in putty | 1 8 | 1 0 |
| Elliptical, or Gothic ditto | 2 0 | 1 3 |
| Ditto, circular on plan | 3 0 | 2 0 |

Add cost of rubbers for "All materials."

To find the level width of impost, without marking out, multiply the half span of arch by depth or thickness of arch, and divide by the radius—*e.g.*, if the half span is 18in., the arch 1 brick thick and radius 72in., the level width of impost will be $\frac{18 \times 9}{72} = 2\frac{1}{4}$in.

## POINTING.

**Labour and "All Materials," per yard super.**

| | s. d. |
|---|---|
| Flat joint or white pointing, including raking out and scaffolding | 1 6 |
| Ditto, to chimney shaft, do. up to 50 feet high | 2 6 |
| Tuck pointing to new work and scaffolding | 3 0 |
| Ditto, to old work, including raking out, cleaning, staining, and scaffolding | 4 0 |
| Struck joint | 0 6 |

## PAVING.

**Labour, &c., per yard super.**

| | Lime or cement. s. d. | Labour. s. d. |
|---|---|---|
| **Bricks** flat in sand, laid straight or herring bone | 0 3 | 0 9 |
| Ditto, on edge, in ditto | 0 4 | 1 0 |
| Ditto, flat in mortar and jointed do. | 0 7 | 1 2 |
| Ditto, on edge, do. | 0 10 | 1 8 |
| If laid flat in cement, add on mortar | 0 4 | 0 3 |
| Ditto, on the edge | 0 6 | 0 4 |
| 9, 10, or 12in. tiles, in mortar | 3 6 | 1 0 |

**Paving Material,** per square yard—

Bricks at 40/- per 1000.

Add 1s. 4d. on flat. 1s. 10d. on edge to above.

**Paving for water channels** or open drains, add from one-fourth to one-half for extra labour.

**Materials required.**—32 bricks paved flat, 44 on edge, $\frac{1}{4}$in. joints; 5$\frac{3}{4}$ of 15in., 9 of 12in., 13 of 10in., and 16 of 9in. tiles, will pave one yard

1 bag cement, 8 cubic feet of sand, for grouting 6 yards.

## SUNDRIES.

| Labour, per foot run. | s. | d. |
|---|---|---|
| Cuttings to 9in. rakes or ramps | 0 | 3 |
| Ditto 14in. do. do. | 0 | 4 |
| Ditto 18in. do. do. | 0 | 6 |
| Chamfering angles | 0 | 2 |
| Cutting birdsmouth and squint | 0 | 3 |
| Raking out and pointing in cement to flashings | 0 | 2 |

**Pointing Door Frames.—Each.—Materials and Labour.**

| | | |
|---|---|---|
| **Bedding** and pointing sash and door frames | 2 | 0 |
| Ditto, large or Venetian frames | 2 | 9 |
| Fixing chimney pots, large | 3 | 0 |
| Ditto, do., medium | 2 | 0 |
| Ditto, do., small | 1 | 6 |
| Setting register stoves complete | 10 | 0 |
| Ditto, colonial ovens, from | 10 | 0 |
| Cutting out and bonding new work to old, toothing courses in mortar, per super ft. | 0 | 6 |
| Ditto, in cement mortar | 1 | 0 |

**Underpinning Walls.**—Cutting away shale or old brickwork to 5ft. high, and rebuilding foundation footings, brick and cement, in lengths not exceeding 5 feet, labour only, per cubic foot, 1/–.

## BRICK MATERIALS.

As the Prices are liable to fluctuation, for large lines, refer to makers' Monthly Lists.

| Sydney and Melbourne, per 1000 at Kiln. | £ | s. | d. |
|---|---|---|---|
| Bricks—Common, or ordinary Patent Kiln bricks | 1 | 16 | 0 |
| Open Kiln, red faced | 3 | 0 | 0 |
| O.K., blue faced | 3 | 10 | 0 |
| Plain double pressed | 4 | 0 | 0 |
| Moulded headers | 7 | 0 | 0 |
| Moulded stretchers | 8 | 0 | 0 |
| Stops, single, 3d. ; double, 6d. ; 9 x 9 | 0 | 1 | 0 |
| Dry pressed, open kiln, bull nose or chamfered | 4 | 15 | 0 |
| Moulded or splayed | 6 | 0 | 0 |
| Dry Pressed Patent Kiln Bricks— | | | |
| Bullnose or chamfered | 3 | 15 | 0 |
| Moulded or splayed | 5 | 10 | 0 |
| Patent Interlocking faced bricks | 4 | 0 | 0 |
| D.P. Moulded Bricks to order | £5 to | 9 | 0 |
| English Fire Bricks, per 1000 | 11 | 0 | 0 |
| Fire Bricks, common, wedge and arch | 5 | 0 | 0 |
| Bulli Fire Bricks | 6 | 10 | 0 |
| Fire Lumps, per cubic ft. | 0 | 9 | 6 |
| English Fireclay, per cubic ft. | 0 | 10 | 0 |
| Fire Clay, per cwt. | 0 | 6 | 0 |
| Ditto, per bag | 0 | 5 | 0 |

**BRICK MATERIALS.**—*Continued.* £ s. d.

Best English Fire Lumps, usual set for baker's furnace, 5 blocks, consisting of one of 36in., one of 30in., three of 18in., per set 2 15 0

**Fire Blocks, each—**

| in. | in. | in. | s. | d. | in. | in. | in. | s. | d. |
|---|---|---|---|---|---|---|---|---|---|
| 12 | x 12 | x 1½ | 0 | 9 | 24 | x 18 | x 3 | 4 | 6 |
| 10 | x 10 | x 2 | 0 | 9 | 24 | x 24 | x 3 | 6 | 0 |
| 12 | x 12 | x 2 | 1 | 0 | 24 | x 24 | x 4 | 8 | 0 |
| 12 | x 9 | x 2 | 0 | 9 | 36 | x 12 | x 6 | 9 | 0 |
| 15 | x 12 | x 2 | 1 | 3 | 30 | x 12 | x 6 | 7 | 6 |
| 18 | x 12 | x 3 | 2 | 0 | 18 | x 12 | x 6 | 4 | 6 |
| 12 | x 12 | x 3 | 1 | 6 | 12 | x 6 | x 2 | 0 | 6 |

Stove bricks, 2/– to 2/6 ; per set, backs, 9d. to 1/–
Oven Tiles, 12in. x 12in. x 2in., 1/6 ; 9in. x 9in. x 2in. – 8d. each.
Ditto, English, 12in. x 12in. x 2in., 1/9
1¾ Dampcourse, ventilated and glazed, each—
12 x 4½, 1½d. ; 8 x 9, 3d. ; 8 x 14, 4½d. ; 8 x 18, 6d.
Paving Tiles, glazed, 12 x 6, per 100 25/–.
G.E. surface Drain Tiles, 4in., 4½d. ; 6in., 6d. per foot.
G.E. Perforated pipes, 4in., 1/– ; 6in., 1/3 per foot.
G.E. Garden Border Tiles, per 100, 10/– to 12/6.
Shell Lime, per bag, 3/–
Stone Lime, per bag, 4/–
Portland Cement, per cask, 11/–.
Clean sharp Yellow Sand, per load, 4/–
Hydraulic Lime, from 68/– to 80/– per ton.
Terra Cotta Ventilators, plain, 9 x 3, 6/– ; louvred, 9/6 per doz.
Gal. Iron Air Bricks, 9 x 3, 5/– ; 9 x 6, louvred, 7/6 per doz.
Ditto, louvred, 9 x 6, 15/– ; Terra Cotta, louvred, 12/– per doz.
" Acme " Patent Galv. Wall Ties, ¾ x ⅛, per 100, 17/6.
Galv. Wire Wall Ties, 8 gauge, 2/6 ; 6 gauge, 3/6.
Dampcourse Slates, Strong American, blue, 18 x 9, per 1000, £9/–/–
Ditto, do. do. 14 x 9, per 1000, £7/–/–.

CARTAGE. s. d.

Carting bricks, including loading and unloading, one mile per 1000, with 2 horse loads .. .. .. .. 7 6
Ditto, add for each mile beyond, per 1000 .. .. .. 1 6
Ditto, with 1 horse drays. ditto .. .. .. .. 8 6
Ditto, for each extra mile .. .. .. .. .. 1 9
Carting slates, sand, lime, or rubbish, per load for one mile, including loading and unloading .. .. .. .. 3 0
Ditto, add for each mile beyond, per load .. .. .. 0 8
Carting scaffolding, per load, for one mile, including loading and unloading .. .. .. .. .. 3 6
Ditto, for each mile beyond first mile, per load .. .. 0 9

To make new chimneys soot proof—Mix ½lb. salt to bucketful of pargetting mortar.

CIRCULAR TANKS, WELLS, SHAFTS, OR CULVERTS.

Table showing earth to be removed, number of bricks (4 courses to 13 inches), and contents in gallons ; also cost at 60s. per cube yard for brickwork in cement (1 to 2), for each foot in depth.

| Clear diam. feet. in. | Half-brick Thick. | | | One Brick Thick. | | | |
|---|---|---|---|---|---|---|---|
| | Earth cube ft. | Bricks, per foot. | Cost, at 60s. s. d. | Earth, cube ft. | Bricks, per foot | Cost. at 60s. s. d. | Gallons, per foot. in depth. |
| 2·3 | 7 | 44 | 7 4 | 11 | 100 | 16 8 | 24·6 |
| 2·6 | 9 | 48 | 8 0 | 13 | 110 | 18 4 | 30·6 |
| 3·0 | 12 | 57 | 9 6 | 16 | 126 | 21 0 | 44·0 |
| 3·6 | 14½ | 65 | 10 10 | 20 | 142 | 23 8 | 61·0 |
| 4·0 | 18 | 73 | 12 2 | 24 | 158 | 26 4 | 73·3 |
| 4·6 | 22 | 82 | 13 1 | 28½ | 174 | 29 0 | 99·1 |
| 5·0 | 26 | 90 | 15 0 | 33½ | 190 | 31 8 | 122·3 |
| 5·6 | 31 | 98 | 16 4 | 38½ | 206 | 34 8 | 148·0 |
| 6·0 | 36 | 107 | 17 10 | 44½ | 222 | 37 0 | 176·2 |
| 6·6 | 41½ | 115 | 19 2 | 51 | 238 | 39 8 | 206·8 |
| 7·0 | 48 | 123 | 20 6 | 57 | 254 | 42 4 | 239·8 |
| 8·0 | 61 | 140 | 23 4 | 71 | 286 | 47 8 | 313·2 |
| 9·0 | 75 | 150 | 25 0 | 87 | 310 | 51 8 | 396·5 |
| 10·0 | 91 | 160 | 26 8 | 104 | 340 | 56 8 | 489·5 |

Semi-circular domes contain the same number of bricks as an equal height of the sides or barrel, *e. g.* a semi-circular dome of 10 ft. diam. and one brick thick contains 340 x 5 = 1700 bricks.

The price given for tanks, &c., one brick thick, would include the excavation in earthwork at Sydney or Melbourne prices.

**Current price** per cubic yard to be ascertained, as per page, and the difference allowed for as per table, *e.g.*, if 50s. reduce one-sixth.

**Square.**—If brickwork was reckoned by the square the measurement and calculation would be greatly simplified.

In buildings, brickwork is generally let by the rod of 272¼ super. feet reduced to 1½ brick thicks, or 306 cubic feet ; but for factory chimneys, bridges, culverts, &c., the cubic yard is used.

**Labour only.**—Doorways and other openings are not deducted, except more than 36 super feet each when half the area is deducted for labour only.

" Labour only " is understood to include the erection of necessary scaffolding, centering, &c., but not providing it.

" Lime (or cement) and mortar " includes scaffolding, centering, moulds, templates, and all materials except bricks.

" All materials " includes lime and mortar and bricks, when all openings are deducted in the measurement, and arches, &c., allowed for. This is the English and standard method.

### Circular Tanks and Shafts.

Levelled Bricks are sometimes used for small wells and tanks by which the labour of cutting the ends of the bricks is saved, and a finer joint obtained. If built with half brick rim the inner face of 9 inch bricks will measure as follows, viz :—

| Clear diam. | | Clear diam. | | Clear diam. | |
|---|---|---|---|---|---|
| Feet. | Inches. | Feet. | Inches. | Feet. | Inches |
| $1\frac{1}{2}$ | 6 | 3 | $7\frac{1}{4}$ | $4\frac{1}{2}$ | 8 |
| 2 | $6\frac{1}{2}$ | $3\frac{1}{2}$ | $7\frac{1}{2}$ | 5 | $8\frac{1}{8}$ |
| $2\frac{1}{2}$ | 7 | 4 | $7\frac{3}{4}$ | 6 | $8\frac{3}{8}$ |

### Circular Tanks and Shafts.

Table showing earth to be removed, number of bricks (4 courses to 13 ins.), and contents in gallons for each foot in depth; also number of bricks in semi-oval domes, with rise equal to one quarter the span.

| Clear diam. feet | One Brick Thick. | | | One and a-half Brick Thick. | | | Gallons each foot in depth |
|---|---|---|---|---|---|---|---|
| | Earth, cu. feet | Number of Bricks. | | Earth, &c cu. foot | Number of Bricks. | | |
| | | Semi-oval dome. | Each foot in depth | | Semi-oval dome. | Each foot in depth | |
| 10 | 104 | 900 | 350 | 118 | 1490 | 540 | 409 |
| 11 | 123 | 1070 | 380 | 138 | 1770 | 590 | 594 |
| 12 | 144 | 1280 | 410 | 160 | 2090 | 640 | 706 |
| 13 | 164 | 1470 | 440 | 183 | 2390 | 690 | 831 |
| 14 | 184 | 1670 | 471 | 208 | 2700 | 740 | 962 |
| 15 | 214 | 1900 | 503 | 234 | 3100 | 790 | 1106 |
| 16 | 241 | 2160 | 535 | 262 | 3520 | 835 | 1256 |
| 17 | 269 | 2470 | 566 | 292 | 3980 | 885 | 1419 |
| 18 | 299 | 2780 | 597 | 323 | 4400 | 930 | 1589 |
| 19 | 331 | 3080 | 628 | 355 | 4880 | 975 | 1775 |
| 20 | 364 | 3400 | 650 | 389 | 5400 | 1025 | 1963 |

N.B.—The above domes are intended to be circular on plan and semi-oval in section, with man-hole in the centre. The 10 feet semi-oval dome requires only 900 bricks, while the semi-circular dome, of the same diameter, requires 1800 bricks. The brickwork of Sydney and Melbourne generally averages 10 bricks to the sup. foot, one brick thick. It will also be found that circular domes contain the same number of bricks as an equal height of the tank they cover provided they are of the same thickness.

Bricks and lime or cement will not properly combine unless the bricks are soaked with water immediately before being used. If this is done the work will never give way in the joints. A similar, but less effective result, may be obtained by watering dry walls before the mortar or cement is set, or partially so by grouting.

TABLE SHOWING THE NUMBER OF BRICKS REQUIRED FOR WALLS *of all areas at* 4,080 *bricks per reduced rod.*

| Area of wall. | Bricks thick and bricks required. | | | | |
|---|---|---|---|---|---|
| | ½-brick. | 1 brick. | 1½ brick. | 2 bricks. | 2½ bricks. |
| 1 | 5 | 10 | 15 | 20 | 25 |
| 2 | 10 | 20 | 30 | 40 | 50 |
| 3 | 15 | 30 | 45 | 60 | 75 |
| 4 | 20 | 40 | 60 | 80 | 100 |
| 5 | 25 | 50 | 75 | 100 | 125 |
| 6 | 30 | 60 | 90 | 120 | 150 |
| 7 | 35 | 70 | 105 | 140 | 175 |
| 8 | 40 | 80 | 120 | 160 | 200 |
| 9 | 45 | 90 | 135 | 180 | 225 |
| 10 | 50 | 100 | 150 | 200 | 250 |
| 20 | 100 | 200 | 300 | 400 | 500 |
| 30 | 150 | 300 | 450 | 600 | 750 |
| 40 | 200 | 400 | 600 | 800 | 1,000 |
| 50 | 250 | 500 | 750 | 1,000 | 1,250 |
| 60 | 300 | 600 | 900 | 1,200 | 1,500 |
| 70 | 350 | 700 | 1,050 | 1,400 | 1,750 |
| 80 | 400 | 800 | 1,200 | 1,600 | 2,000 |
| 90 | 450 | 900 | 1,350 | 1,800 | 2,250 |
| 100 | 500 | 1,000 | 1,500 | 2,000 | 2,500 |
| 200 | 1,000 | 2,000 | 3,000 | 4,000 | 5,000 |
| 300 | 1.500 | 3,000 | 4,500 | 6,000 | 7,500 |
| 400 | 2,000 | 4,000 | 6,000 | 8,000 | 10,000 |
| 500 | 2,500 | 5,000 | 7,500 | 10,000 | 12,500 |
| 600 | 3,000 | 6,000 | 9,000 | 12,000 | 15,000 |
| 700 | 3,500 | 7,000 | 10,500 | 14,000 | 17,000 |
| 800 | 4,000 | 8,000 | 12,000 | 16,000 | 20,000 |
| 900 | 4,500 | 9,000 | 13,500 | 18,000 | 22,500 |
| 1,000 | 5,000 | 10,000 | 15,000 | 20,000 | 25,000 |
| 2,000 | 10,000 | 20,000 | 30,000 | 40,000 | 50,000 |
| 3,000 | 15,000 | 30,000 | 45,000 | 60,000 | 75,000 |
| 4,000 | 20,000 | 40,000 | 60,000 | 80,000 | 100,000 |
| 5,000 | 25,000 | 50,000 | 75,000 | 100,000 | 125,000 |
| 6,000 | 30,000 | 70,000 | 90,000 | 120,000 | 150,000 |
| 7,000 | 35,000 | 70,000 | 105,000 | 140,000 | 175,000 |
| 8,000 | 40,000 | 80,000 | 120,000 | 160,000 | 200,000 |
| 9,000 | 45,000 | 90,000 | 135,000 | 180,000 | 225,000 |
| 10,000 | 50,000 | 100.000 | 150,000 | 200,000 | 250,000 |
| 20,000 | 100,000 | 200,000 | 300,000 | 400,000 | 500,000 |
| 30,000 | 150,000 | 300,000 | 450,000 | 600,000 | 750,000 |
| 40,000 | 200,000 | 400 000 | 600,000 | 800,000 | 1,000,000 |
| 50,000 | 250,000 | 500,000 | 750,000 | 1,000,000 | 1,250,000 |

Table showing the value from One, to Two Hundred and Seventy-two Feet of reduced Brick Work, from £3 to £12 per Rod.

| Feet. | At £3 per Rod. | | | At £4 per Rod. | | | At £6 per Rod. | | | At £8 per Rod. | | | At £10 per Rod. | | | At £12 per Rod. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s. | d. | £ | s | d. |
| 1 | 0 | 0 | 2½ | 0 | 0 | 3½ | 0 | 0 | 5 | 0 | 0 | 7 | 0 | 0 | 9 | 0 | 0 | 10½ |
| 2 | 0 | 0 | 5 | 0 | 0 | 7 | 0 | 0 | 10½ | 0 | 1 | 2 | 0 | 1 | 5½ | 0 | 1 | 9 |
| 3 | 0 | 0 | 8 | 0 | 0 | 10½ | 0 | 1 | 4 | 0 | 1 | 9 | 0 | 2 | 2 | 0 | 2 | 7½ |
| 4 | 0 | 0 | 11 | 0 | 1 | 2 | 0 | 1 | 9 | 0 | 2 | 4 | 0 | 2 | 11 | 0 | 3 | 6 |
| 5 | 0 | 1 | 1 | 0 | 1 | 5½ | 0 | 2 | 2 | 0 | 2 | 11 | 0 | 3 | 8 | 0 | 4 | 5 |
| 6 | 0 | 1 | 4 | 0 | 1 | 9 | 0 | 2 | 8 | 0 | 3 | 6 | 0 | 4 | 5 | 0 | 5 | 3½ |
| 7 | 0 | 1 | 7 | 0 | 2 | 1 | 0 | 3 | 1 | 0 | 4 | 1 | 0 | 5 | 2 | 0 | 6 | 2 |
| 8 | 0 | 1 | 9 | 0 | 2 | 4 | 0 | 3 | 6 | 0 | 4 | 8½ | 0 | 5 | 10½ | 0 | 7 | 0½ |
| 9 | 0 | 2 | 0 | 0 | 2 | 8 | 0 | 3 | 11½ | 0 | 5 | 3½ | 0 | 6 | 7 | 0 | 7 | 11 |
| 10 | 0 | 2 | 3 | 0 | 2 | 11 | 0 | 4 | 5 | 0 | 5 | 10½ | 0 | 7 | 4 | 0 | 8 | 10 |
| 15 | 0 | 3 | 4 | 0 | 4 | 5 | 0 | 6 | 7 | 0 | 8 | 10 | 0 | 11 | 0 | 0 | 13 | 3 |
| 20 | 0 | 4 | 5 | 0 | 5 | 10½ | 0 | 8 | 10 | 0 | 11 | 9 | 0 | 14 | 8½ | 0 | 17 | 8 |
| 25 | 0 | 5 | 6 | 0 | 7 | 4 | 0 | 11 | 0 | 0 | 14 | 8½ | 0 | 18 | 4½ | 1 | 2 | 0½ |
| 30 | 0 | 6 | 7 | 0 | 8 | 10 | 0 | 13 | 3 | 0 | 17 | 8 | 1 | 2 | 1 | 1 | 6 | 6 |
| 40 | 0 | 8 | 10 | 0 | 11 | 9 | 0 | 17 | 8 | 1 | 3 | 6 | 1 | 9 | 5 | 1 | 15 | 3½ |
| 50 | 0 | 11 | 0 | 0 | 14 | 8½ | 1 | 2 | 1 | 1 | 9 | 5 | 1 | 16 | 9 | 2 | 4 | 1 |
| 60 | 0 | 13 | 3 | 0 | 17 | 8 | 1 | 6 | 5½ | 1 | 15 | 3½ | 2 | 4 | 1 | 2 | 12 | 11 |
| 70 | 0 | 15 | 5 | 1 | 0 | 7 | 1 | 10 | 10½ | 2 | 1 | 2 | 2 | 11 | 5½ | 3 | 1 | 9 |
| 80 | 0 | 17 | 8 | 1 | 3 | 6 | 1 | 15 | 3½ | 2 | 7 | 0½ | 2 | 18 | 10 | 3 | 10 | 7 |
| 90 | 0 | 19 | 10 | 1 | 6 | 5½ | 1 | 19 | 8½ | 2 | 12 | 11 | 3 | 6 | 2 | 3 | 19 | 5 |
| 100 | 1 | 2 | 1 | 1 | 9 | 5 | 2 | 4 | 1 | 2 | 18 | 10 | 3 | 13 | 6 | 4 | 8 | 2 |
| 110 | 1 | 4 | 3 | 1 | 12 | 4 | 2 | 8 | 6 | 3 | 4 | 8 | 4 | 0 | 10½ | 4 | 17 | 0½ |
| 120 | 1 | 6 | 6 | 1 | 15 | 3½ | 2 | 12 | 11 | 3 | 10 | 7 | 4 | 8 | 3 | 5 | 5 | 10½ |
| 130 | 1 | 8 | 8 | 1 | 18 | 3 | 2 | 17 | 4 | 3 | 16 | 5½ | 4 | 15 | 7 | 5 | 14 | 8½ |
| 140 | 1 | 10 | 11 | 2 | 1 | 2 | 3 | 1 | 9 | 4 | 2 | 4 | 5 | 2 | 11 | 6 | 3 | 6 |
| 150 | 1 | 13 | 1 | 2 | 4 | 1 | 3 | 6 | 2 | 4 | 8 | 3 | 5 | 10 | 3½ | 6 | 12 | 4 |
| 160 | 1 | 15 | 4 | 2 | 7 | 0½ | 3 | 10 | 7 | 4 | 14 | 1 | 5 | 17 | 8 | 7 | 1 | 2 |
| 170 | 1 | 17 | 6 | 2 | 10 | 0 | 3 | 15 | 0 | 5 | 0 | 0 | 6 | 5 | 0 | 7 | 10 | 0 |
| 180 | 1 | 19 | 9 | 2 | 12 | 11 | 3 | 19 | 5 | 5 | 5 | 10½ | 6 | 12 | 4 | 7 | 18 | 10 |
| 190 | 2 | 1 | 11 | 2 | 15 | 10½ | 4 | 3 | 10 | 5 | 11 | 9 | 6 | 19 | 8 | 8 | 7 | 8 |
| 200 | 2 | 4 | 1 | 2 | 18 | 10 | 4 | 8 | 3 | 5 | 17 | 8 | 7 | 7 | 0½ | 8 | 16 | 5½ |
| 210 | 2 | 6 | 4 | 3 | 1 | 9 | 4 | 12 | 8 | 6 | 3 | 6 | 7 | 14 | 5 | 9 | 5 | 3½ |
| 220 | 2 | 8 | 6 | 3 | 4 | 8½ | 4 | 17 | 0½ | 6 | 9 | 5 | 8 | 1 | 9 | 9 | 14 | 1 |
| 230 | 2 | 10 | 9 | 3 | 7 | 8 | 5 | 1 | 5½ | 6 | 15 | 3½ | 8 | 9 | 1 | 10 | 2 | 11 |
| 240 | 2 | 12 | 11 | 3 | 10 | 7 | 5 | 5 | 10½ | 7 | 1 | 2 | 8 | 16 | 5½ | 10 | 11 | 9 |
| 250 | 2 | 15 | 2 | 3 | 13 | 6 | 5 | 10 | 3½ | 7 | 7 | 0½ | 9 | 3 | 10 | 11 | 0 | 7 |
| 260 | 2 | 17 | 4 | 3 | 16 | 5½ | 5 | 14 | 8½ | 7 | 12 | 11 | 9 | 11 | 2 | 11 | 9 | 5 |
| 270 | 2 | 19 | 7 | 3 | 19 | 5 | 5 | 19 | 1½ | 7 | 18 | 10 | 9 | 18 | 6 | 11 | 18 | 3 |
| 272 | 3 | 0 | 0 | 4 | 0 | 0 | 6 | 0 | 0 | 8 | 0 | 0 | 10 | 0 | 0 | 12 | 0 | 0 |

By adding, halving, or doubling, as may be requisite, any quantity or value can be obtained from the above Table.

# TERRA COTTA.

**Terra Cotta Lumber** is used for fire proof ceilings, floors, girder casing, column casing, and partitions. The shape and size of lumber varies in every instance, and in some cases it may be advantageous to use lumber designed on the interlocking pattern.

Terra Cotta Lumber is made either hard and strong, or soft and light, to suit required conditions.

These hollow blocks are much lighter than solid brickwork and therefore especially adapted for arches; its crushing weight is said to be 840lbs. per square inch, and will effectually resist the joint assault of fire and water. It will also readily receive nails driven into it for slating, &c., without the use of the usual wooden battens.

| **Terra Cotta Lumber,** on rail at works, Sydney or Melbourne, per square yard— | Material. s. d. | Labour and laying only. s. d. |
|---|---|---|
| Floors, 6in. thick .. .. .. .. | 5 0 | 2 0 |
| Ditto, 9in. thick .. .. .. .. | 6 6 | 2 3 |
| Centering, 2/–; cement, 3 to 1, 1/– .. .. .. .. | | 3 0 |
| Sizes—9 x 4½, 9 x 6, 9 x 9, 12 x 6, 12 x 9, per sq. yd., from .. | | 4 0 |

Add cartage to work, and hoisting per floor.

| Perforated Partition Bricks, 30/– to 40/– per 1000 at works :— | | Labour and Cement. |
|---|---|---|
| Partitions, 2in. thick .. .. .. .. | 2 0 | 2 0 |
| Ditto, 3in. thick .. .. .. .. | 2 6 | 2 3 |
| Ditto, 4 to 4½ .. .. .. .. .. | 3 0 | 2 6 |
| Ditto, 6in. thick .. .. .. .. | 3 9 | 3 0 |

Sizes—9in. x 6in. x 2in., 12in. x 6in. x 3in.

## SPECIALITIES—MATERIALS ONLY.

Terra Cotta Vases and Pedestals, from 7/6 to 40/– each.
Ditto, Weathered Sills, 11½in. x 6½in. x 29in. long, 13/–
Ditto, Coping, 10in. x 6in. x 14in. long, 5/6
Balusters, Moulded and fluted, 6in. sq. x 18in. long, 6/–
Ditto, moulded 7in., round 24in., 7/–
Trusses, 18 x 10½, 5/– each. 10in. x 8in., 3/– each.
Keystones, Panels, Mouldings, Caps, Vases, &c., according to design.
**Chimney Pots,** Red or buff, 10in. to 17in. high .. 2/6 to 4/6
Ditto, Octagon, round and fluted, 22in. to 27in. high 4/– to 6/–
Ditto, Diamond pattern, with Venetian Cap Blowers 9/– to 15/–
Add extra for Windguard, 1/–; Blowers, 1/8; V. Caps, to pot, 3/– each.
Glazed Earthenware Pots, similar designs and prices, fixing, cement, 2/–
Air Bricks, Terra Cotta, per dozen—

| 9in. x 3in. | 9in. x 6in. | 12in. x 6in. | 12in. x 9in. |
|---|---|---|---|
| 6/– | 9/– | 15/– | 20/– |

**Terra Cotta Wall Tiles**—
Wall facing tiles, draper pattern, 9 x 9 x ⅝. 1/–
Ditto, other patterns, 6 x 6, 6d.
**Terra Cotta Floor Tiles,** 8 x 8 x ⅝, per 100, 17/6.
Number required per sq. yard, 20¼; per 100 sq. ft., 225.
Enamelled Tiles, or "Briquettes," chamfered, all colors, suitable for fireplaces, 6 x 3 and 6 x 2, per yd... .. 15/– to 25/–

# TILER.

## WALL AND FLOOR TILES.

**Labour only** [including Cement and Sand].

| | per sq. yard. |
|---|---|
| **Floor Tiler,** wages, 9/– to 10/– per day. | |
| Laying Verandahs, Halls and Porch floors | 1/9 to 2/6 |
| Ditto, Walls, Dadoes, Fireplaces, from | 2/– to 3/6 |
| Ditto, Encaustic and Mosaic Tiles, according to design | 2/6 to 7/6 |
| Ditto, Hearths, each, from | 2/– |
| Ditto, Special Dadoes or Wallfillings, from | 3/– |
| Add for ½in. floating bed on cement, per yard | 1/– |
| 4in. sandstone or broken brick concrete, for foundation to floors, &c., per yard | 4/– |

## TILE PAVING AND HEARTHS.

Exclusive of Laying.

| | |
|---|---|
| Verandah or Floor Tiling in plain colors, per sq. yd., from | 6/6 |
| Ditto, in selected designs, with encaustic, blue, green, white, &c., per sq. yard, from | 8/6 to 15/– |
| Hearths, 4ft. x 1ft. 3in., each, from | 7/6 |
| Fancy Majolica Tiles, panel designs, from | 7/6 to 10/6 |
| Plain printed Glazed Tiles, 6 x 6, per doz., 3/–; per sq. yard | 9/– |
| Coloured Glazed Tiles, 6 x 6, per doz., 4/–; per sq. yard | 12/– |
| Panels for Grates, 30in. x 6in., artistic designs, per pair | 5/– to 13/– |
| Wall Glazed White, 6 x 6 and 6 x 3, per sq. yard | 7/6 |
| Wall Tiling in 6 x 6 or 6 x 3, best quality white glazed, per sq. yd. | 9/– |
| Plain Enamelled Tiles, in blood red, old gold, dark and light green, light and dark blue, peacock, &c., 6in. x 2in., and 6in. x 3in., tiles, per hearth, each | 10/6 to 15/6 |
| Ditto do. and filling on walls, per sq. yard, from | 14/– to 25/– |
| Dadoes, in rich colors, according to selection, per sq. yard | 17/6 to 35/– |
| Skirting, 6in. x 6in., suitable for lavatories and bathrooms, doz. | 7/6 |
| Ditto, in special colors, per doz. | 9/6 |
| Moulding and Capping, in brown, per doz. | 4/6 |
| Ditto, in special colors, per doz. | 5/6 |
| Fancy Majolica, per doz. | 5/– to 7/– |
| **Faience** Work, "Bas" or "Pan-relief," in all designs, glazed and unglazed, from, per yard | £3 to £5 |

Specially made Vitreous floor and wall tiling, for hospitals and butter factories. Designs and quotations should be specially obtained.

Ceramic Mosaic Tiles, per sq. yard .. .. .. .. 12/6 to 17/6

**Marble (Fender) Kerbs for Hearths—**

| | 3in. x 2in. | 4in. x 3in. |
|---|---|---|
| White Sicilian, round top or chamfered | 17/6 | 27/6 |
| St. Annes or Rouge | 22/6 | 30/– |

O.G. or Moulded Pattern, 5/– to 10/– extra per fender.

## OPALITE WALL TILING.

**Opal Glass Tiling,** apart from the ordinary white and tinted kinds, is enamelled in a variety of colours, plain and decorative, suitable for dadoes, friezes, wall fillings, sanitary and reflective light walls, &c.

The designs are from hand-painted originals, in the same enamels as are used for painting china, and are fired at a very high temperature, thus ensuring permanency. Special attention has been paid to the key for fixing.

The finished surface is true, not warped or buckled ; the face and edges being fine fitting and true.

### Stock Sizes, Unfixed.

White Tiles, 9 x 3, 9 x 4, 6 x 3, per yard super. .. .. .. 7/4
Tinted in colours, or marbled, mottled, Granitic patterns, .. 9/6
Decorative borders, friezes, dadoes, 3d. per inch, per foot. Thus
a 3in. border costs 9d., and a 4in. costs 1/–.
Extra for fixing with the company's special cement, per yard.. 2/6
Extensively used in Government Buildings, Subways, and Sanitary Walls.

## PATENT TILING AND WALLING.

There are several Seagliola and other imitation marbles of chemical composition, said to have the natural and artistic properties of real marble. Most rare and expensive marbles, granites and mosaics are represented in this material. The markings go right through the material.

They are said to stand heat and cold without crazing or cracking.
Labour—Price for fixing Floors, Halls, per sq. yard, from .. 1/–
Cost, the same as tiles, per sq. yard, from .. .. .. .. 8/–

Coloured Cement Tiles, 8in. sq. x $\frac{7}{8}$in. thick, per sq. yard .. 5/– to 20/–

### Tiles required per sq. yard.

| Size. | Net No. | Size. | Net. No. |
|---|---|---|---|
| 3 x 3 Tiles .. .. | 144 | 7 x 7 Tiles .. | 26½ |
| 4 x 4 ,, .. .. | 81 | 8 x 8 ,, .. | 20¼ |
| 5 x 5 ,, .. .. | 52 | 9 x 9 ,, .. | 16 |
| 6 x 3 ,, .. .. | 72 | 10 x 10 ,, .. | 13 |
| 6 x 6 ,, .. .. | 36 | 12 x 12 ,, .. | 9 |

**Ceramic Mosaic Tiling** is composed of small circular, square, and octagon vitrified porcelain tiles about $\frac{3}{4}$-inch x $\frac{1}{4}$-inch thick, formed into numerous designs and mounted upside down on paper similar to other mosaics. They are laid on the prepared cement bed with the paper surface upwards. The paper being removed after the mosaic is in position.

# SLATER, TILER, SHINGLER.

## SLATING, PER SQUARE

### Measurement, if not otherwise stipulated.

Take the net measurement of area covered.

Add the length of the eaves by 1 foot wide.

Add the length of all cuttings to hips, valleys, dormers, chimneys, &c., by 6 inches wide.

The battens generally specified are 2in. x 1in. deal ; if wider they are apt to curl up with the heat and loosen the slates.

**Spacing.**—Battens for slates and shingles require the same distance apart, centre to centre, that the width of slates exposed show when laid.

To find the number of battens to length of rafter :—The lap or cover of slates, &c., varies according to material used and pitch of roof to be covered.

The following table is reckoned for a 3½in. lap—that usually specified.

If the slates fit closely, 2½inch lap is sufficient. The larger the lap the more the slates *cock up*. When the slates do not fit closely, the roofs require *rendering* in lime and hair mortar.

Allowing that 2½in. lap is sufficient for a Gothic roof of 60 deg., then 3in. lap should be used for a square roof, 3½in. for a third pitch, and 4in. lap for a quarter pitch roof.

The *cuttings*, next hips and ridges are generally bedded in mortar.

## SLATES AND BATTENS REQUIRED PER SQUARE

### Laid with a 3½in. lap or cover.

*Weight per square about* 6 *cwt.*

| | Weight per 1000, | Number required | Battens per square | Labour and |
|---|---|---|---|---|
| | Cwt. | per square | | Nails. |
| Duchess, 24 × 12 .. | 50 | 120 | 120 | 7/– |
| Countess, 20 × 10 .. | 33⅜ | 180 | 150 | 8/– |
| Viscountess, 18 × 10 .. | 30 | 208 | 175 | 9/– |
| Ladies, 16 × 8 .. .. | 20⅞ | 300 | 200 | 10/– |

Eaves or cuttings to waste must be allowed for.

**Circular slating,** one-third to one-fourth extra for labour, but for materials according to actual waste in radiating the sides, &c.

For **fancy cut slating,** reckon from one-third to twice more for the labour, which includes nailing on the battens.

For stripping roofs, reckon one-half the given prices, for " Labour and metal nails."

N.B.—In addition to the above sizes, slates 22 x 12, 22 x 11, 20 x 12, 18 x 9, 16 x 9, and 16 x 8 are imported ; also green slates and blood reds from America.

## MATERIALS.

The prices of slates vary according to tariff and supply. The present prices per 1000 are :—

Countess slates, 20 x 10, red and blue, Bangor, £16/10/–
Penrhyn, purple Bangor, 20 x 10, £17.
Port Madoe, blue, £12/10/–.
American slates, blue, £12.
Eureka green, £15.
Dampcourse slates, thick, 14in. x 9in., £7.
Ditto do. 18in. x 9in., £9/10/–.
Rendering or pargetting slate joints, per foot run, about 1d.
Ditto do. in lime and hair mortar, per square, 8/–.
Bedding, Hips and Ridges, per foot run, 2d.

**Fibro cement slates,** 16 x 16 x $\frac{1}{8}$, per 1000, £23. These patent slates (asbestos and cement) are made in purple, blue, red and grey, of various sizes and thicknesses, with mouldings, ridge and hip pieces, coverings, and special shaped tiles for ornamentation, of the same composition.

When the 16 x 16 x $\frac{1}{8}$ slate is used in diagonal pattern, 2in. lap, 1000 will cover 131 sq. yards, or 11.79 sq. ft. ; weight, 5 cwt.

**Fibro-cement sheets,** for fireproof construction, per sq. yard, 2/6.
Agents, John Hardie & Co., Sydney.

Battens required for F.C. above slates, 150 ft. run ; labour, laying, 6/– per square.

## ROOF.

### TILING AND SHINGLING.

**Terra Cotta Tiles,** French pattern, per 1000, £7/15/– to £8/10/–.
Requiring 127 tiles per square, or 1000 tiles nearly 8 squares.

**Terra Cotta Shingle Tiles,** per 1000, £3/5/– to £3/18/–.
Requiring 550 tiles per square.

**Glass Roofing Tiles,** to match, Marseilles pattern, each 2/6.
Terra Cotta Plain Ridges, per foot, 4d. to 8d.
Crests, each, 7d.
Starter, each, 1/3.
Battlement Ridges, per foot, 1/6.
Bargeboards, straight lengths, per font, 1/6.
Ditto do. End Pieces, each, 2/6
Plain Finials, for roof, each, 3/6 to 9/–.
Ornamental Finials, each, 16/– to 25/–.
End Rolls, each, 5/–.
Gable Stop Ends, each, 1/–.
Angle Tiles, each, 6d.

*See* Advertisement, Goodlet & Smith, page 3.

Melbourne Prices of Marseilles Tiles, range from, per sq. 38/– to 45/–
Fixed on roof, including battens and wire.

## SHINGLING.

Metal Shingles, stamped zinc, per square laid from, £2. *See* details and prices, "METAL WORKER."
Redwood Shingles, per bundle .. .. .. .. .. 7/-
Oak Shingles, 15 x 3½, 8 bundles cover 100 sq. feet.
Price, 3/- per bundle = £1/4/- per 100 sq. feet.
Redwood Shingling, 4 bundles cover 100 sq. feet, at 7/- = £1/8/-
Number of Shingles a good tradesman should lay per day of 8 hours :—
Shingles on a roof, 2000 to 3200
Shingles on walls, 1500 to 2000

### NUMBER OF SHINGLES OR SHINGLE TILES.

Required to cover a square, stating average width of shingle and length exposed to weather, or width of rows seen.

| Width of Rows. | Width of Shingle. | | 1000 Shingles will cover ft. | |
|---|---|---|---|---|
| seen. Inches. | 4in. | 6in. | 4in. Shingle. sq. ft. | 6in. Shingle. sq. ft. |
| 4 | 900 | 600 | 110 | 168 |
| 5 | 725 | 485 | 140 | 210 |
| 6 | 605 | 405 | 167 | 250 |
| 7 | 515 | 345 | 195 | 292 |
| 8 | 451 | 306 | 225 | 335 |

### Labour per square and Battens required.

| | Labour. | Battens. |
|---|---|---|
| Metal Shingles, from .. .. .. .. | 5/6 | 100 |
| Redwood Shingles, .. .. .. | 8/- | 190 |
| Oak Shingles, 15 x 3½, .. .. .. | 9/- | 210 |
| Shingle Tiles .. .. .. .. .. | 9/- | 190 |
| Tiles, French pattern .. .. .. | 5/- | 90 |
| Wall or Gable add 30 per cent. for labour | | |
| Half 5ft. Palings, 100 per square .. .. | 4/- | |
| Half 6ft. Palings, 85 per square .. .. | 3/9 | |

### Terra Cotta Roofing.

This cheerful and picturesque roofing material is very suitable for our bright and warm climate, as it is much cooler than slates, although slightly heavier. It does not necessitate any alteration in the construction of roof supporting timbers.

The weight of Tiles (Marseilles pattern) is about 7cwt. to the square when laid.

1000 Tiles weigh 2¾ tons.

The shingle pattern tile is also made with fancy cut edges, suitable for ornamenting small roofs, over porches, dormer windows, balconettes, and projecting window shades.

It is not advisable to have the pitch of roofs too flat, owing to the collection of dust and moisture, which in course of time will discolour the tiles.

### Zinc Tile Roofing.

The ornamental zinc tile roofing is very light, and can be used with advantage in covering steeples, pinnacle roofs, mansard roofs, and other steeply pitched constructions, or where weight has to be considered.

(*See* METAL WORKER for particulars.)

## GENERAL ROOFING ESTIMATES.

### Labour and covers per square.

| | £ | s. | d. |
|---|---|---|---|
| **Galvanised Iron,** at £19 per ton, or 19/– per cwt.— | | | |
| 1⅛ cwt. per square, 26 gauge .. .. .. .. | 1 | 1 | 6 |
| Labour, laying iron, 2/6 ; screws and washers, 6d. .. | 0 | 3 | 0 |
| Rafters, 2 ft. spaced, 6—10's —60ft. run, 4 x 2, at 15/–.. | 0 | 9 | 0 |
| Labour, cutting rafters and fixing battens, 2/6, and nails | 0 | 3 | 6 |
| Net price .. | £1 | 17 | 0 |
| **Redwood Shingles,** at 7/– per bundle, 4 bundle shingles per square, at 7/– .. .. .. .. .. | 1 | 8 | 0 |
| Battens, 190 feet run, 2 x 1, at 17/– ; nails .. .. | 0 | 5 | 6 |
| Labour, shingling, 8/– ; battens, 2/– ; nails, 2/6 .. | 0 | 12 | 6 |
| | £2 | 6 | 0 |

### Rafters to the square.

| | | | |
|---|---|---|---|
| Oregon Rafters, plain gable roof, spaced 18in. apart, 8—10's —80ft. 4 x 2, at 16/– .. .. .. .. .. | 0 | 12 | 0 |
| Labour, cutting, hauling and fixing, 3/6 ; nails, 6d... .. | 0 | 4 | 0 |
| Net .. | £0 | 16 | 0 |
| Add extra for hips, waste and profit. | | | |
| **Terra Cotta Tiles,** French pattern, £8 per 1000— | | | |
| Tiles, 130 per square — 16/– per 100 .. .. .. | 1 | 1 | 6 |
| Battens, 90 ft. run, 2 x 1 oregon ; nails .. .. .. | 0 | 2 | 9 |
| Labour to tiles, 4/6 ; battens, 1/– ; 1lb. copper wire 1/6 | 0 | 7 | 0 |
| Net .. | £1 | 11 | 3 |
| Rafters as above to be added. | | | |
| **Bangor Slates,** 20 x 10, at £16 per 1000— | | | |
| Slates, 180 per square — .. .. .. .. .. | 2 | 17 | 7 |
| Battens, 150 ft. run, 2 x 1 — 25 sup. ft. at 16/–.. .. | 0 | 4 | 0 |
| Nails, 6d. ; and 2lb. slate compo. nails, 1/– .. .. | 0 | 1 | 6 |
| Labour to slates and battens .. .. .. .. | 0 | 7 | 0 |
| Net .. | £3 | 10 | 1 |
| Add for cartage, profit. | | | |
| Stamped Metal Shingling, about .. .. .. .. | £2 | 14 | 0 |

## TIMBER.

*Summary of prices.*

In Melbourne, Timber in some instances is sold by the lineal foot, such as flooring and lining, &c., but for comparison, I have endeavoured to give the price in superficial feet. For monthly list, apply to James Moore & Sons, who issue extensively compiled detail items. The Sydney merchants issue a combined list, extracts of which are reprinted.

| | Smallest Girt. | | |
|---|---|---|---|
| | 9in. | 10in. | 12in. |
| | s. d. | s. d. | s. d. |
| Turpentine Piles, per ft. run, up to 40 ft. .. | 1 3 | 1 4 | 1 6 |
| Ditto, 41 to 50 ft. .. .. .. | 1 6 | 1 8 | 1 9 |
| Ditto, 51 to 60ft. .. .. .. | 1 9 | 1 11 | 2 0 |

| | Sydney. | Melbourne. |
|---|---|---|
| | s. d. | s. d. |
| Ironbark Piles, 2d. to 3d. more per foot run. | | |
| Beech, in scantlings, per 100 ft. sup. .. | 40 0 | 40 0 |
| Hardwood ditto ditto .. .. | 11 0 | 9 0 |
| Blackwood for joinery do. do. .. | 25 0 | 25 0 |
| Ironbark in scantlings do. .. .. | 20 0 | 19 0 |
| Tallow wood for joinery do. .. | 19 0 | |
| Kauri Pine, cut to sizes do. .. | 20 0 | 22 0 |
| Richmond River or Colonial Pine, cut to sizes .. .. .. .. .. | 22 0 | |
| Cedar boards, per sup. ft., ½in., 4½d., 1in., 7d., 2in., 1s. .. .. .. .. .. | | about ⅛ more. |
| Oregon Pine, cut to sizes .. .. .. | 15 0 | 15 0 |
| American Shelving, cut to sizes, per 100 .. | 20 0 | 15 0 |
| Pacific Pine .. .. .. .. .. | | 15 0 |
| Ditto, Sugar Pine, cut to sizes .. .. | 35 0 | 36s. to 38 0 |
| Ditto, clear pine, cut to sizes .. .. | 40 0 | 42 0 |
| Redwood, cut to sizes, per 100 sup. ft. .. | 22 6 | |
| Maryborough (Queensland) Pine, cut to sizes | 25 0 | 26 0 |
| Laths, Redwood, per bundle .. .. | 7 6 | 6 0 |
| Arris Rails, H.W., 100 ft. run, 3in. .. .. | 8 0 | |
| Ditto do. 4in. .. .. .. | 11 0 | |
| **Natural Oregon Spars, for Derrick Poles—** | | |
| 70ft. long, 15in. at base, 8in. at top, ft. run | 3 0 | |
| Palings, 5ft. sawn Hardwood .. .. | 15 0 | |
| Ditto 6ft. do. .. .. .. | 17 6 | |
| Weatherboards, sawn hardwood, per 100 s. ft. | 14 0 | |
| Ditto, Baltic Pine, 7in. plain, per 100 lin. ft. | 8 3 | |
| Rustic, per 100 sup. ft. .. .. .. | 24 0 | |
| Posts and Rails, one-third post, per 100 .. | 60 0 | |

## TIMBER.

*Prices subject to fluctuation.*

For large supplies, refer Timber Merchants' Monthly Price Lists.

| | Sydney. | Melbourne |
|---|---|---|
| Cedar, 12 x 1, per foot run | 0 6 | |
| American Ash, 1 to 3in. thick, as imported ft. run | 0 6 | |
| American Oak, 1 to 2½in. thick, per foot run | 0 8 | |
| American Walnut, per foot run | 0 10 | |
| American Hickory, per foot run | 0 7 | |
| | per 100 s. ft. | |
| American Pines, Michigan, special clear for joinery | 54 0 | |
| Sugar Pine, 1 to 2in., special clear for joinery | 37 6 | |
| Ditto, 2½ to 3in., special clear for joinery | 45/– | |
| Yellow Pine, 1 to 2in., special clear for joinery | 34 0 | |
| Ditto, 2½ to 3in., special clear for joinery | 39 0 | |
| Arris Rails, 3 x 3, Hardwood, 8/–; 4 x 4 | 11 6 | |
| Hardwood, stock sizes, to 15 ft., 3 x 1, 3 x 2, | | |
| 4 x 2½, 5 x 2½, 6 x 2½ | 15 6 | 10 0 |
| Over 25 ft. | 17 0 | 12 6 |
| 6 x 6, 7 x 7, 8 x 8, 9 x 9, 10 x 10 | 18 6 | 13 6 |
| Tallowwood, extra | 2 0 | |
| Ironbark, 6 x 12 x 4 | 19 0 | 14 0 |
| Ditto, 12 x 6 | 21/– | 16 0 |
| | cu. ft. | |
| **Ironbark Girders,** 9 x 9 to 14 x 14, 36 ft. long, | 2 2 | |
| Ditto, do. do. 37 to 45 ft. long | 2 6 | |
| | per 100 | |
| **Oregon,** up to 30ft. long and 12in. wide | 16 0 | 17 0 |
| Battens and boards, 1/– extra, for joinery, 2/– extra. | | |
| Laths, 10 bundles, 4ft. 6in. x 1¼in. | 27 6 | |
| **Redwood**—½in. thick, per 100 ft. super | 16 0 | |
| ¾in. thick | 19 0 | |
| 1in. thick, and over 18 inches wide | 22 0 | |
| Richmond River or Queensland Pine | 15 0 | |
| Wider than 12in. | 18 0 | |
| N.Z. Kauri Pine, 4½ to 9 x ½, boards | 17 0 | 15 0 |
| 4½ to 12 x 1 | 24 6 | 26 6 |
| 4½ to 18 x 1 | 27 6 | |
| White Pine boards— | | |
| ½in. thick to 12 inches wide | 12 0 | 12 0 |
| 1in. thick to 12 inches wide | 13 6 | 14 0 |
| Tasmanian Blackwood, 6 to 12 x 1, lin. ft. | 0 3¼ | 0 3¼ |
| Pitch Pine, 4½in. planks, per lin. ft. | 0 3½ | 0 3½ |
| Silky Oak and Beanwood, per lin. ft. | 0 6 | 0 5 |
| Clear Pine, per lin. ft. | 0 6½ | 0 6 |
| Pacific Pine, cut to sizes, per 100ft., from | 15 6 | 14 6 |
| Rough Lining, 9 in. wide (6 out of 3in.) | 7 3 | 7 0 |
| Hoop Pine | | 13 0 |

## TIMBER.

### T. & G. FLOORING.

| | Sydney. | Melbourne |
|---|---|---|
| Hardwood, 6 x $\frac{7}{8}$ and 4 x $\frac{7}{8}$ | 16 0 | 13 0 |
| Tallowwood | 20 0 | |
| Beech, 6 x $\frac{7}{8}$ | 28 0 | |
| Queensland and Colonial Pine | 22 6 | |
| Baltic | 18 6 | 18 0 |
| N.Z. White Pine | 17 6 | 17 0 |
| Oregon | 20 0 | 16 0 |
| N.Z. Kauri, 6 x $\frac{7}{8}$ | 24 6 | 18 0 |
| Jarrah, 5$\frac{1}{2}$ x 1 | | 26 0 |
| Hoop Pine, 6 x $\frac{7}{8}$ | | 15 0 |

### LINING—T. & G., Beaded, or V. Joint.

Per 100 super feet.

| | Inches. 6 x $\frac{1}{2}$ | Inches. 4 x $\frac{3}{4}$ | Inches. 6 x $\frac{1}{2}$ | Inches. 6 x $\frac{3}{4}$ |
|---|---|---|---|---|
| Baltic | — | — | 12/6 | 17/9 |
| Colonial | 15/– | 18/6 | 14/6 | 18/– |
| Kauri | 17/– | 23/– | 16/– | 22/– |
| N.Z. White Pine | 12/6 | 15/– | 12/– | 14/6 |

Oregon, 3$\frac{1}{2}$ x $\frac{1}{2}$ boards, T. and G., and beaded, superior, in special lengths, 5/6 per 100 super feet extra.

**Combination Lining**—Specially prepared with bevel, checked and rabbated joint—

| | Oregon. | Redwood. |
|---|---|---|
| 6 x 1, for wooden buildings, per 100 lin. ft. | 8 6 | 12 0 |
| 9 x 1 ditto. do. do. | 13 6 | 17 6 |

**Partition Linings**— 100 super ft.

| | |
|---|---|
| Baltic T. & G., beaded, or V. joint, both sides, 6 x 1 | 22 0 |
| Oregon do. do. do. | 22 0 |
| White Pine do. do. do. | 20 0 |
| Kauri do. do. do. | 28 0 |

**Weatherboards**—

| | |
|---|---|
| Hardwood, rough splayed, 7in., 14/–; dressed | 16 0 |
| Mahogany, Rustic, 9in., dressed | 21 0 |
| Redwood, Rustic, 9 in., dressed | 24 0 |
| Kauri Pine, Rustic, 9in. | 24 6 |
| Maryborough Pine | 23 0 |
| Baltic, dressed and chamfered, 7in., per 100 lin, ft. | 12 6 |

**Shelving**, dressed—

| | |
|---|---|
| American Clear Spruce, 12 x 1 | 26 0 |
| Colonial Pine, 12 x 1 | 22 6 |
| Kauri | 25 0 |
| N.Z. White Pine | 17 6 |

## SPACING TABLE.

Showing the **nearest Number** of Hooks, Spikes, Laths, Dental Blocks, Pickets, Battens, Palings, &c., required when spaced in a **given length** (starting and finishing with **one**).

(Note.—If not starting with *one*, deduct it on Table.)

| Given length in ft. | Spacing in Inches. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 5 | 21 | 16 | 13 | 11 | 9 | 9 | 8 | 7 | 6 | 6 | 6 | 5 | 5 |
| 6 | 25 | 19 | 15 | 13 | 11 | 10 | 9 | 8 | 7 | 7 | 7 | 6 | 6 |
| 7 | 29 | 22 | 17 | 15 | 13 | 12 | 10 | 9 | 8 | 8 | 8 | 7 | 7 |
| 8 | 33 | 25 | 20 | 17 | 15 | 13 | 11 | 10 | 9 | 9 | 9 | 8 | 7 |
| 9 | 37 | 28 | 23 | 19 | 17 | 15 | 13 | 12 | 11 | 10 | 9 | 8 | 8 |
| 10 | 41 | 31 | 25 | 21 | 18 | 16 | 14 | 13 | 12 | 11 | 10 | 9 | 9 |
| 11 | 45 | 34 | 29 | 23 | 20 | 18 | 15 | 14 | 13 | 12 | 11 | 10 | 10 |
| 12 | 49 | 37 | 30 | 25 | 22 | 19 | 17 | 16 | 14 | 13 | 12 | 11 | 11 |
| 13 | 53 | 40 | 32 | 27 | 23 | 21 | 18 | 17 | 16 | 14 | 13 | 12 | 12 |
| 14 | 57 | 43 | 34 | 29 | 25 | 22 | 20 | 18 | 17 | 15 | 14 | 13 | 13 |
| 15 | 61 | 46 | 37 | 31 | 27 | 24 | 21 | 19 | 18 | 16 | 15 | 14 | 14 |
| 18 | 73 | 55 | 44 | 37 | 32 | 28 | 25 | 23 | 20 | 18 | 17 | 16 | 15 |
| 20 | 85 | 61 | 49 | 41 | 35 | 31 | 28 | 25 | 23 | 21 | 19 | 18 | 17 |
| 25 | 101 | 76 | 61 | 51 | 44 | 39 | 34 | 31 | 29 | 26 | 24 | 22 | 21 |
| 30 | 121 | 91 | 73 | 61 | 52 | 46 | 41 | 37 | 34 | 31 | 29 | 27 | 25 |
| 35 | 141 | 106 | 85 | 71 | 61 | 54 | 48 | 43 | 39 | 36 | 33 | 31 | 29 |
| 40 | 161 | 121 | 97 | 81 | 69 | 61 | 55 | 49 | 45 | 41 | 37 | 35 | 33 |
| 45 | 181 | 136 | 109 | 91 | 78 | 69 | 61 | 55 | 50 | 46 | 41 | 39 | 37 |
| 50 | 201 | 151 | 121 | 101 | 87 | 76 | 68 | 61 | 56 | 51 | 47 | 44 | 41 |
| 60 | 241 | 181 | 145 | 121 | 103 | 91 | 81 | 73 | 66 | 61 | 56 | 52 | 49 |
| 70 | 281 | 211 | 169 | 141 | 121 | 106 | 93 | 85 | 77 | 71 | 65 | 61 | 57 |
| 80 | 321 | 241 | 193 | 161 | 138 | 121 | 107 | 97 | 88 | 81 | 74 | 69 | 65 |
| 90 | 361 | 271 | 217 | 181 | 155 | 136 | 121 | 109 | 99 | 91 | 84 | 78 | 72 |
| 100 | 401 | 301 | 241 | 201 | 172 | 151 | 134 | 121 | 111 | 101 | 93 | 86 | 81 |

N.B.—If not starting with one deduct it on table.

The above is a simple division table to save contractor's time.

**Example** of how to use Spacing Table :—To find number of hooks or pickets, 5 inches apart, in 50 feet (starting and finishing with one) — 121—number required. Number of studs or joists, 17 inches apart in 25 feet (starting and finishing with one) — 19—number required.

SPACING TABLE.—Useful for finding the **nearest Number** of Pickets, Battens, Studs, Joists, Projections, Sleepers, Posts, &c., in a given length, over 15 inches apart :—

| Lin. feet run. | Spacing in Inches. 15 | 16 | 17 | 18 | 20 | 24 | 30 | 36 | 42 | 48 | 60 | 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 5 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| 6 | 6 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 3 | 3 | 3 | 3 |
| 7 | 7 | 7 | 6 | 6 | 6 | 5 | 4 | 4 | 3 | 3 | 3 | 3 |
| 8 | 7 | 7 | 7 | 7 | 6 | 5 | 5 | 4 | 4 | 3 | 3 | 3 |
| 9 | 8 | 8 | 8 | 7 | 7 | 6 | 5 | 4 | 4 | 4 | 3 | 3 |
| 10 | 9 | 9 | 9 | 8 | 7 | 6 | 5 | 5 | 4 | 4 | 3 | 3 |
| 11 | 10 | 10 | 9 | 9 | 8 | 7 | 6 | 5 | 5 | 4 | 4 | 3 |
| 12 | 11 | 10 | 9 | 9 | 9 | 7 | 6 | 5 | 5 | 4 | 4 | 4 |
| 13 | 12 | 11 | 10 | 10 | 9 | 8 | 7 | 6 | 5 | 5 | 4 | 4 |
| 14 | 13 | 12 | 11 | 11 | 10 | 8 | 7 | 6 | 5 | 5 | 4 | 4 |
| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 7 | 6 | 6 | 5 | 4 | 4 |
| 18 | 15 | 15 | 14 | 13 | 12 | 10 | 9 | 7 | 7 | 6 | 5 | 4 |
| 20 | 17 | 16 | 15 | 15 | 13 | 11 | 9 | 8 | 7 | 6 | 5 | 5 |
| 25 | 21 | 20 | 19 | 18 | 16 | 14 | 11 | 10 | 9 | 8 | 6 | 6 |
| 30 | 25 | 24 | 22 | 21 | 19 | 16 | 13 | 11 | 10 | 9 | 7 | 6 |
| 35 | 29 | 28 | 27 | 25 | 22 | 19 | 15 | 13 | 11 | 10 | 8 | 7 |
| 40 | 33 | 31 | 30 | 28 | 25 | 21 | 17 | 15 | 13 | 11 | 9 | 8 |
| 45 | 37 | 35 | 33 | 31 | 28 | 24 | 19 | 16 | 14 | 13 | 10 | 9 |
| 50 | 41 | 38 | 37 | 35 | 31 | 26 | 21 | 18 | 16 | 14 | 11 | 10 |

If not starting with one, deduct it upon Table.

For Spacing Table up to 1 mile, for fencing posts, or droppers, &c., *see* WIRE-WORKER.

PINE TRELLIS WORK, folded together for convenience, packing, and transport—

Sizes when opened—8 to 12 feet long by 2 feet to 8 feet high.

3in. mesh .. .. .. .. .. .. 2d per square foot.
4in. mesh .. .. .. .. .. 1½d per square foot.

Made to special sizes—

| 3 | 2½ | 2 | 1½ | 1 | in mesh. |
|---|---|---|---|---|---|
| -/2 | -/2½ | -/2½ | -/3½ | -/4¾ | per sq. foot. |

**Parquet flooring.**—Anglo-Swiss, in polished hardwoods, viz., ebony, oak, walnut, maple, cherry, &c., one inch thick. T.G. and secretly nailed, well seasoned and very durable. It can be laid complete from 18s. per sup. yard, exclusive of the cost of common floor, about 6s., upon which it it is laid.

**Italian Parquet flooring,** delivered f.o.b. at Venice, from 11s. 6d. to 23s. per sup. yard. It is made in quarter mitres (½ mitre square) of walnut, maple and oak. Hoffnung's warehouse, Pitt-street, Sydney, contains samples laid complete.

**New Zealand Parquetry.**—*See* end of New Zealand Building Materials at end of this book.

**Cedar Shelving,** for Library, with 2 x 1¼ cedar nosing partitions 5 ft. apart, labor only, per sup. ft. .. .. .. .. 7d.
Redwood ditto ditto .. .. .. .. 6d.

# CARPENTER.

## MEASUREMENT.

Timber is generally measured by the 100 feet super.

The superior kinds, such as cedar, mahogany, rosewood, Tasmanian blackwood, veneers, &c., by the super foot.

The labour is by the 100 feet square of piecework such as studs, battens, shingle, T. and G. and other partitions, joisting and flooring, framing, roofing, and ceiling, weatherboards.

It will be a saving of time when estimating to form cost price per square (locally), including allowance for waste on lengths.

Round timbers, for **woolsheds, stockyards,** corner posts, telegraph poles.

Bridge and small wharf piles are by the pole or single piece.

Larger piles, over a foot in diameter, struts and beams, by cube foot.

Ceiling, slate, and wall battenings, by the 100 square feet, viz., 10ft. x 10ft.

*See* Quantities and Measurements, page 17.

N.B.—The whole of the foregoing items in Carpentry and Joinery are cast out at 15d. per hour, with deal at 4d. per super foot 1 in thick, and are about the cost price for ordinary work under the most favourable circumstances. In estimating at 1s. 6d. per hour, add one-fifth to the labour, and at least 10 per cent. on the whole cost for incidental expenses besides profit.

## RULES FOR MEASUREMENT.

**Circular work** of every description in Joinery to be charged as follows, viz. :—

**Flat sweep,** not more than $\frac{1}{2}$ inch rise per foot, or curves of circles not less than 3 feet diameter, once and a half the price of straight work.

**Quick sweep,** or more than $\frac{1}{2}$ inch rise per 12 inch chord, twice the price of similar straight work.

**Elliptical,** the same, according to sharpness of the curves.

The above proportions apply to the shape on the plan, or to the elevation only.

If they occur on both plan and elevation as circular circular, they must be reckoned twice or three times the price of circular on plan only, *e.g.*, if flat sweep on both plan and elevation, the proportion would be $1\frac{1}{2} \times 2 = 3$ times the price of straight work.

If quick sweep on both plan and elevation, the proportion would be $2 \times 3 = 6$ times the price of similar straight work.

If flat sweep on plan and quick in elevation, $4\frac{1}{2}$ times.

If quick sweep on plan, and flat in elevation, 4 times the price of similar straight work.

## MEASUREMENT—CARPENTER & JOINER.

**Circular sashes,** frames, shutters, &c., to be measured square, and circular heads to doors, &c., to be measured square above the springing, which gives an addition of 21½ per cent. on the net measurement, exclusive of the extra charge determined by the previous Rules.

**Circular, plain glued in thickness,** for all degrees of curvature take twice the price of similar straight solid work, and if circular circular, from 3 to 4 times, according to sharpness of curves.

**Cornices.**—In measuring cornices the mouldings do not include the splay of weathering, which is to be taken as boarding, wrought, &c., as the case may be.

**The cost of labour** for **Joinery** on Australian cedar, Huon pine, pitch pine, &c., is about 25 per cent. more than the cost of similar labour to, **deal.**

The labour to **Australian Hardwoods, American Walnut,** and **Teak,** if well seasoned costs from 50 to 75 per cent. more than the cost of similar work to **deal** or **clear pine.**

**In carpentry,** where the surfaces are not wrought, the extra labour required in hardwoods seldom exceeds 15 per cent. more that the labour on similar deal scantlings.

The cost of roofing in hardwood or Oregon for this reason is about the same, including materials.

### FLOORS AND ROOFS.

**Carpenter, Labour per square of 100 super. feet,** using usual sized Scantling for Naked Framed Floors, including nails. Wages, 1/3 per hour.

| | Material used. Inches. | Labour and Nails. Net. |
|---|---|---|
| **Spaced 18in.—** | | s. d. |
| H.W. Ground joists, bedded and level, not framed | 5 x 2½ | 3 0 |
| Ditto, and 1st floor, notched on to plates and girders | 6 x 2½ | 3 9 |
| Ditto, framed to chimneys and well-holes .. .. | 6 x 3 | 5 0 |
| Ditto, common ceiling joists, notched on to plates | 4 x 2½ | 3 0 |
| 18in. Oregon floor joists, 9 x 3 and 12 x 3 .. .. | | 5 0 |
| H.W. Intermediate Trimmers to well-holes, &c. .. | | 7 0 |
| Pine herring-bone strutting, per foot run .. .. | 2 x 2 | 0 2½ |
| **Labour,** Laying **Flooring boards,** per square, from | | 2/6 to 4/– |

### ROOFS.

| | Labour, per square. |
|---|---|
| 18in. common shed or lean-to roof, for slates or tiles | 4 x 2 | 2 9 |
| 3 feet do. do. for Galv. Iron .. .. | 4 x 2½ | 1 6 |
| 2-storey gable roof, cut to ridge pole or wall-plates | 4 x 2½ | 3 9 |
| Ditto, if bevels cut at mills, reckon fixing only .. | | 2 0 |
| Ditto, hips and valleys .. .. .. .. .. | | 5 6 |
| Ditto, levelling, cutting in pole plates, 2in. x 2in. H.W. per ft. run | | 0 2 |

For more than 2-storey, add for hauling material and scaffolding per square .. .. .. .. .. .. .. 1 0

## RAILWAY SLEEPERS.

The best sleepers are those made from seasoned blue or red gum, ironbark, blackwood, or box. The trees should be barked and allowed to die before they are felled, by which means they become partly seasoned; the season for falling Australian timber is from March to September, when the sap falls; it should then be split or sawn and stacked in the shade in such a manner that it may be well ventilated; but with every precaution, the ends will open more or less; this may be partly stayed by bolting them. It would be worse than useless to tar unseasoned timber, which would only hasten its decay by preventing the sap evaporating. These remarks apply to all kinds of Australian timber and for all purposes. *Floor timbers* and boards should be seasoned by ventilation in the shade or by frequent turning in the sun, to prevent warping, and then coated with wood-preserving oil.

## BUSHWORK—SLEEPER GETTERS.

*Prices in N.S.W. Association.*

Ironbark, 9 feet long, regulation size, 4/– each; 8 feet long, 3/1.
Box or Gum, 9 feet long, regulation size, 3/9 each; 8 feet long, 2/10 each.

### Sawn Sleepers in Victoria.

| 8ft. x 9in. x 4½in. each | s. | d. |
|---|---|---|
| Falling, barking, and trimming trees | 0 | 7 |
| Removing logs to saw pits, within half a mile | 0 | 4 |
| Squaring and preparing timber for sawyers, and sawing complete | 0 | 10 |
| Removing from pit and stacking | 0 | 3 |
| Cost price per sleeper near pit as above, average | 2 | 0 |
| Loading, cartage, and unloading, for first mile | 0 | 6 |
| Add for each additional mile | 0 | 2 |
| Boring sleeper, 9 inches wide, at both ends | 0 | 3½ |
| Riveting sleeper, with ½-in. iron rivets | 0 | 2½ |
| Removing from heap and re-stacking | 0 | 3 |
| To which must be added the cost of the two iron rivets and washers, about 1½lbs., and profit on the whole. | | |
| Adzing sleepers for permanent way, per 100 | 15 | 0 |

*Sawn sided* are far superior to the half round sleepers, because very young timber is always inferior to that which has arrived at maturity, as it contains a large proportion of heart and *white* or outside, which is never sound; and although sufficient of the *white* is adzed away to bed the chair, the remainder soon rots, thereby destroying the sleeper and loosening the ballast surrounding it.

**The above sleepers** average about 14 to the ton.

Red gum, ironbark and box sleepers last from 12 to 15 years.

Messmate and stringy bark sleepers last only 5 or 6 years.

**Hardwood Timber.**—In choosing trees for sawn timber, posts, slabs, &c., avoid those with dead branches, which are often an indication of decay when the trees otherwise appear sound. The best wood is always found in full-grown trees, upon dry soils or slopes.

*Post, Rails, and Slabs, per* 100.

| | Labour only | |
|---|---|---|
| | *s.* | *d.* |
| Falling, sawing, and splitting iron bark slabs, $5\frac{1}{2}$ ft. $\times$ $11\frac{1}{2}$ ins. $\times$ $1\frac{1}{2}$ inch .. .. .. | 10 | 0 |
| Ditto, stringy bark slabs, do. .. .. .. | 7 | 0 |
| Ditto, do. $3\frac{1}{2}$ ft. $\times$ 11 ins. $\times$ $1\frac{1}{2}$ ins. .. .. | 5 | 0 |
| Ditto, iron bark do. .. .. .. | 7 | 0 |
| Ditto, stringy bark, box or gum posts, 7 ft. by 9 in. $\times$ 4 ins., and rails 9 ft. by 6 ins. $\times$ 3 ins. viz. 25 posts and 75 rails .. .. .. .. | 20 | 0 |
| Falling, sawing, and splitting hardwood posts and rails (as per last item) for 3 rail fencing, at per rod | 1 | 8 |
| FENCING, *per rod, labour only.* | | |
| Mortising posts, adzing rails, sinking holes, and putting up 3-rail fence complete .. .. | 3 | 0 |
| Nailing 5 feet narrow *spaced* paling on do .. | 0 | 6 |
| Ditto, wide close pailing, 6 nails each, on do. .. | 1 | 0 |

*In Splitting* ironbark, the slabs, posts, &c., are split parallel with the *rings*, and generally thin out towards the top, but in stringy bark the slabs are generally split in radiating lines from the centre outwards, and in this manner have been split 2 feet wide by 5 feet long,

## RAILWAY BUFFER FRAMES.

| | s. | d. |
|---|---|---|
| Hardwood curbing, uprights, heads, sills, struts, sleepers, &c., framed, housed and bolted, labour only at per cu. ft. . .. .. | 2 | 0 |

Ironwork to be charged by the pound.

## RAILWAY GATES, N. S. WALES.

*For level crossings per cube foot.*

| | s. | d. |
|---|---|---|
| Hardwood wrought in posts, struts, guard rail, &c. | 7 | 0 |
| 10 or 12 feet gates, Baltic deal, wrought, framed, tapered and stop chamfered .. .. .. | 12 | 0 |
| 10 feet gates, including hardwood, deal, ironwork, painting and hanging complete, about £40 | 0 | 0 |
| 12 foot gates, ditto ditto ditto £47 | 0 | 0 |

### Rough Timber Bridges—Labour.

| *Hardwood.* | s. | d. |
|---|---|---|
| Falling, trimming, and barking gum or box, for piles, bearers, struts, &c., from 15 to 18 inches diam., and from 20 to 40 feet long, per lin. foot | 0 | 9 |
| Rough adzing and squaring ditto do. .. | 0 | 6 |
| Piling in clay, sand, loose gravel, &c. do. .. | 1 | 6 |
| Hoisting, framing, fixing, bolting, &c. do. .. | 1 | 0 |
| The above complete per lin. foot .. .. | 3 | 9 |
| Sawn planking, railings, guard rails, &c., fixed and bolted, complete, per cube foot .. .. | 4 | 0 |
| Wrought hand-rails, &c., framed and fixed, complete, per cube foot .. .. .. | 5 | 6 |
| Add bolts, straps, &c., per lb. from 3d. to | 0 | 5 |
| Cartage of hardwood per cubic foot, including loading and unloading for first mile .. .. | 0 | 3 |
| Ditto for every additional mile .. .. | 0 | 1 |
| Cartage of 25 posts and 75 rails (scantling as above, weighing 3 tons) for first mile, including loading and unloading by bullock team .. .. | 4 | 6 |
| Ditto, for each additional mile .. .. | 1 | 0 |

### Hardwood Bridges, Piling, &c.

| *First class.* | s. | d. |
|---|---|---|
| Hardwood round piles (vertical) from 20 to 40 feet long, driven complete, per lin. foot .. .. | 3 | 6 |
| Ditto, raking ditto, or vertical sheet piling, p. l. foot | 4 | 6 |
| If in shallow water, or if more than 40 ft. long add | 1 | 0 |
| Labour in pile driving, including staging, &c., per lineal foot from .. .. .. 1s. 6d. to | 2 | 0 |
| Hardwood sawn sided, bolted and fixed in walings braces, collars, struts, straining pieces, corbels, girders or joists, per cube foot .. .. | 4 | 6 |
| Hardwood, wrought, framed, and chamfered in stanchions, sills, diagonal braces, hand-rails, &c. | 6 | 0 |
| Hardwood, rough wrought and splayed, in guards, fenders, &c., per cubic foot .. .. .. | 5 | 0 |

HARDWOOD BRIDGES, PILING, &c.—*Continued.*

| | s. | d. |
|---|---|---|
| Hardwood 4 inch planking in roadway, &c., laid and spiked, 3s. 6d. 3 in. ditto per cu. ft. .. | 3 | 0 |
| Ditto, 2 inch do. in footways, &c. do. .. | 4 | 0 |

The above items include the fixing only of all ironwork, in piles, &c.: also hardwood within 2 miles.

Ironbark piles from 20 to 50 ft. long, and 12 to 18 ins. diam. per lin. foot, in Darling Harbour, Sydney from 1s. 6d. to 2s.

Laminated bridge of 70 feet span and 16 feet wide, 4 arched ribs each, with four 10 × 4 planks on raking piles, &c., for springing, cost about £6 per lin. foot, and large strutted bridges about £9 per lin. foot complete.

## CARPENTERS' WORK.

*N.B.—The whole of the prices given in Carpentry and Joinery are for hand labour at 15d per hour to deal or pine, unless otherwise mentioned.*

### Deal or Pine in Scantlings.

*Labour only, at 15d per hour.*

| | Per cu. ft. s. | Per cu. ft. d. | Per 100 s. ft s. | Per 100 s. ft d. |
|---|---|---|---|---|
| Beams, breast-summers, wall-plates, pole-plates, lintels, templates, wood-bricks, sleepers, &c. .. .. .. | 0 | 7½ | 4 | 10 |
| Framing, rough, ordinary scantlings .. | 1 | 1 | 9 | 0 |
| Ditto, wrought .. .. .. | 1 | 7 | 13 | 0 |
| Ditto, do., and stop chamfered .. .. | 1 | 9 | 14 | 6 |
| Ditto, do., and rebated .. | 2 | 0 | 16 | 8 |
| Ditto, do., do., and beaded .. | 2 | 2 | 18 | 0 |
| Wrought rebated and beaded door and window frames with sunk and weathered hardwood sills .. .. .. | 3 | 0 | 25 | 0 |
| Joists, ground, ceiling-floor, or ceiling joists, notched or housed and spiked .. | 0 | 10 | 7 | 0 |
| Ditto, framed to binding joists, girders, &c. | 1 | 0 | 8 | 4 |
| Ditto, single-framed floors, trimmed to well holes, chimneys, &c. .. .. | 1 | 1 | 9 | 0 |
| Add for each storey above ground floor .. | 0 | 1 | 0 | 8 |
| Partitions, 3 in. × 2 in., framed .. | 1 | 3 | 10 | 6 |
| Ditto, 4 or 5 × 3 .. .. | 1 | 0 | 8 | 6 |
| If braced, add for each side .. .. | 0 | 1 | 0 | 8 |
| Ditto, trussed with king posts, add .. | 0 | 3 | 2 | 0 |
| Ditto, with king and queen add .. | 0 | 4 | 2 | 9 |

N.B.—If in hardwood add from 10 to 20 per cent

## ROOF— CONSTANTS FOR ASCERTAINING THE LENGTH OF RAFTERS AND HIPS.

**The Half-Span being Unity, or 1.**

| | Slope. | Angle of Rafter. | Angle of Hip. | Length of Rafter. | Length of Hip. | Height of Roof. |
|---|---|---|---|---|---|---|
| | | deg. min. | deg. min. | | | |
| Rise $\frac{1}{8}$ span ... | 4 to 1 | 14.3 | 10.2 | 1.031 | 1.437 | .250 |
| „ $\frac{1}{6}$ „ ... | 3 to 1 | 18.26 | 13.15 | 1.054 | 1.452 | .333 |
| „ 1-5 „ ... | $2\frac{1}{2}$ to 1 | 21.49 | 15.47 | 1.077 | 1.469 | .400 |
| „ $\frac{1}{4}$ „ ... | 2 to 1 | 26.34 | 19.27 | 1.118 | 1.500 | .500 |
| „ $\frac{1}{3}$ „ ... | $1\frac{1}{2}$ to 1 | 33.42 | 25.14 | 1.202 | 1.563 | .667 |
| Square roof ... | 1 to 1 | 45. | 35.16 | 1.414 | 1.732 | 1.000 |
| Rise $\frac{2}{3}$ span ... | $\frac{3}{4}$ to 1 | 53.8 | 43.19 | 1.667 | 1.943 | 1.333 |
| „ $\frac{3}{4}$ „ ... | $\frac{2}{3}$ to 1 | 56.19 | 46.41 | 1.803 | 2.062 | 1.500 |
| Gothic roof ... | | 60. | 50.56 | 2.000 | 2.236 | 1.732 |
| Rise = span. | $\frac{1}{2}$ to 1 | 63,27 | 54.44 | 2.237 | 2.449 | 2.000 |

**Roofs.**—To obtain the length of the rafter and hip of a square roof, with a pitch of 1 to 1, from the above table. Assuming the half span to be 13 feet, then the rafter will be = 1.414 × 13 = 18.38, or 18ft. 4⅝ins., the hip rafter being 1.732 × 13 = 22.52 = 22ft. 6¼ins.

## ROOFING.—LABOUR AND NAILS AT 1/3 PER HOUR. CUTTING, BORING AND FIXING.

| | Per cu. ft. s. d. | Per 100. s. d. |
|---|---|---|
| **Single span or valley roof** over ground floor .. .. | 1 0 | 8 0 |
| Ditto, for every extra floor, add .. .. .. | 0 1 | 0 8 |
| **Girders, binders, struts, angle ties,** and **curb roofing,** with pole plates, and rafters .. .. .. | 1 0 | 8 0 |
| **King truss** roof, with purlins, &c. .. .. .. | 1 6 | 12 0 |
| **Queen truss** roof, from 30 to 45 feet span, with purlins, &c., over ground floor .. .. .. | 1 8 | 14 0 |
| **Framed roofing,** from 45 to 60 feet span, with principals, king, queen, and prince posts, struts and purlins, over ground floors .. .. .. | 2 0 | 16 0 |
| Ditto, if higher, add per storey .. .. .. | 0 1 | 0 8 |
| **Fixing Ironwork,** king or hanging bolts, stirrups, ties, straps, &c., per lb. .. .. .. | 0 2 | 1 4 |

**Laminated semi-circular roof trusses,** wrought all sides, painted before being put together, and nailed in thicknesses is worth from 50 to 70 per cent. more than for similar solid framing.

**Laminated semi-oval roof trusses** similarly treated from 70 to 100 per cent. more than for solid framing.

**Equilateral Gothic Oregon truss,** 43 feet span, principals 12 x 6; tie beams, 10 x 5, with hammer beams, wrought below collar ties, stop chamfered and fitted; cost price per truss, about £6. Raising the above with four men, derrick, &c., about 15/–.

## ROOFING.—*Continued.*

HARDWOOD.—Add from 15 to 25 per cent. on the roof items for extra labour. The Australian hardwoods are generally worked before they are even half seasoned, hence the slightly increased cost of working them, as compared to deal. This is the cause of the cracked ceilings and sunken floors of some of the buildings in Sydney. In Melbourne hardwood is seldom used in first-class buildings for these reasons.

### BRACKETING, *including plugging.*

| *Labour and nails, per foot super* | s. | d. |
|---|---|---|
| Common cornices or coves 1½ inch deal, measuring where lathed .. .. .. .. | 0 | 5 |
| Wagon headed ceilings, passages &c., measuring where lathed .. .. .. .. | 0 | 3 |
| Groined ceilings in halls ditto .. .. | 0 | 9 |
| GUTTERS, inch and 1¼ inch deal and bearers ... | 0 | 5 |
| Ditto. to curb roof, add .. .. .. | 0 | 2 |
| Ditto, if curved on plan, add from 2d. to | 0 | 4 |

### CENTERING.

*Labour and nails per foot super.*

| | | |
|---|---|---|
| Centering for brick trimmers, or gauged arches, or culverts .. .. .. ... | 0 | 5 |
| Ditto, small groined arches .. .. .. | 0 | 10 |
| Common centering on 3 in. ribs, with inch battens for vaults and large culverts .. .. .. | 0 | 4 |
| Heavy centering for arches, 15 to 30 feet span .. | 0 | 7 |
| Centering for concentric segmental (circular circular) arches of brickwork or coke concrete, 16 to 20 feet span, springing from circular iron girders on piers for covered reservoirs, &c., the centering being formed on trussed ribs (radiating in plan) from 3 to 5 feet apart, and covered with colonial pine laggings 1½ × 1½ per sup. foot .. | 0 | 9 |

N.B. If the cost of centering is included in the price of brickwork, stonework, &c., the arches, &c., should be taken separately, or the openings not deducted. If the same centre is used for more than one opening, the setting and striking only should be reckoned and one-half the cost of the centre.

## WEATHERBOARDING.

| Labour per Square Fixed. | Labour s. | d. |
|---|---|---|
| Deals, rough, $\frac{3}{4}$ or 6 boards to a 3in. deal | 5 | 0 |
| Ditto, Wrought | 12 | 0 |
| Ditto do. and beaded | 14 | 0 |

If machine wrought, reckon first item only.

## ESTIMATE OF HARDWOOD WEATHERBOARD FENCING.

*Per rod of 16ft.*

| | | |
|---|---|---|
| 2 posts, 9 x 6 x $2\frac{1}{2}$ = 23 super feet<br>2 rails, 16 x 4 x $2\frac{1}{2}$ = 32 super feet<br>Struts and bases every other post, = 7 super feet | = 62 super feet, at 14/– per 100 sup. ft. | 9 | 0 |
| Weatherboards, 32 6's = 192 lin. ft. = 112 sup. ft. at 14/– per 100 | | 15 | 0 |
| Labour and nails | | 5 | 0 |
| 3 coats painting, 32ft. x 6ft., both sides = 192 sup. ft. = 21 sq. yds., at 6d. | | 11 | 0 |
| | | 40 | 0 |

## ESTIMATE SAWN HARDWOOD FENCING—CLOSE PALING.

*Per rod of 16 feet.*

| | | |
|---|---|---|
| 2 rails 16 x 3 x 2 = 32 ft., at 14/– per 100 = | 4 | 6 |
| 2 posts, 8 x 6 x $2\frac{1}{2}$ = 20ft., at 13/6 per 100 | 3 | 0 |
| 40 palings, 6ft., at 15/– per 100 | 6 | 0 |
| (Average, $4\frac{1}{2}$ + $\frac{1}{2}$ spacing in 5. *See* Table of Spacing.) | | |
| Nails and iron bonding | 2 | 0 |
| Labour per rod | 3 | 6 |
| | 19 | 0 |

## HEAVY H.W. STEPS—DRESSED AND FIXED.

| | | |
|---|---|---|
| Flight of 38 treads, 12 x 3, nosed steps, 4ft. wide, 30ft. close strings 12in. x 3, housed and bolted— | | |
| Labour only—2 carpenters, 52 hours = 1 man, 104 hours at 1/3 | £6 | 10 |
| 150 super feet Hardwood and Oregon, at 16/– per 100 super. feet | 1 | 4 |
| | £7 | 14 |

## SUNDRIES.

| | | |
|---|---|---|
| Picket Hardwood Fencing Posts, 8ft. x 5 x 5, with moulded caps ; 2 arris rails, 4 x 4 ; ornamental pickets, 4ft. 6in. x 3 x 1, per lin. ft., materials, 1/–, and labour 1/– | 2 | 0 |
| 2 rail, 6 ft. split paling fence, with split posts and rails, at per lin ft. | 1 | 0 |
| Fillets and rough boarding for pugging, per square | 40 | 0 |
| Planing fir clean from the saw, per super ft. | 0 | 1 |
| Ditto, if old saw cut, per super ft. | 0 | $1\frac{1}{2}$ |
| Fixing door frames in new walls, each | 2 | 0 |

Side ties joining legs, 9 of 50ft.

## GANTRIES.

### LABOUR ONLY.

| | c. ft. s. d. | 100 s. ft. s. d. |
|---|---|---|
| Framework for steam building whips .. .. | 1 10 | 20 0 |
| **Gantry** for travelling crane, braced, strutted and bolted together, not more than 40 feet high (Oregon pine) .. .. .. .. .. | 1 6 | 12 6 |
| Add for every 10 feet extra height .. .. .. | 0 1 | 0 8 |

Travelling crane (Oregon) trussed with iron tie rods, bars, &c., about double these prices, including hoisting.

Labour in fixing and hoisting ironwork, including wheels and axles to do., per lb., 1d.

The bolts, dog-irons, &c., will not exceed 1lb. per cubic foot.

## TRIPOD GANTRY TOWERS FOR STATIONARY STEAM DERRICK CRANE.

(According to Municipal Regulations for Scaffolding.—*See* Index.)

### MATERIALS.

For a 50 Feet Tower.

6ft. x 6ft., braced and bolted legs, in 10 feet bays, and 50 feet span.

| | Lin. ft. | Inches. | sup. ft. |
|---|---|---|---|
| Corner posts, 12 of 50ft. .. .. | 600 | 7 x 7 — | 24.54 |
| Corner rails, 72 of 6ft. .. .. | 432 | 5 x 3 — | 5.40 |
| Diag. braces, 120 of 15ft. .. .. | 1800 | 7 x 3 — | 31.50 |
| **Sleepers** and plates, 12 of 8ft. .. | 96 | 9 x 9 — | 648 |
| **Centre posts,** 3 of 50ft. .. .. | 150 | 10 x 10 — | 1259 |
| Side ties joining legs, 9 of 50ft. .. | 450 | 9 x 3 — | 1012 |
| Side braces, 12 of 80ft. .. .. | 960 | 7 x 3 — | 1680 |
| Fish plates, 80 of 6ft. .. .. | 480 | 7 x 3 — | 840 |
| | | | 11583 |
| Top plates, 3 of 60 .. .. .. | 180 | 10 x 10 — | 1500 |
| | | | 13083 |

For every 10 feet higher, add one-fifth for extra materials and labour in hauling.

Top platform to be added—**Bolts and Iron Straps** for 50 feet, about 70 cwt. **Labour** to above, 10/– per 100 super. feet.

Raising and fixing 7 ton steam derrick crane on to 50 ft. derrick, in position, from £20, labour.

(Price of Crane—*See* Electrical.

Weighting, material, use of small accessory crane for raising and striking to be added.

# TIMBER MERCHANTS' TABLE OF BOARDS.

To Find the Superficial Contents of **One inch Boards** of different widths.

Length of Board in Feet.

| Boards. Size in inches. | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 .. | 1.3 | 1.6 | 1.9 | 2.0 | 2.3 | 2.6 | 2.9 | 3. | 3.3 | 3.6 | 3.9 | 4.0 | 4.3 | 4.6 | 4. 9 | 5.0 |
| 4 .. | 1.8 | 2.0 | 2.4 | 2.8 | 3.0 | 3.4 | 3.8 | 4. | 4.4 | 4.8 | 5.0 | 5.4 | 5.8 | 6.0 | 6.4 | 6.8 |
| 5 .. | 2.1 | 2.6 | 2.11 | 3.4 | 3.9 | 4.2 | 4.7 | 5. | 5.5 | 5.10 | 6.3 | 6.8 | 7.1 | 7.6 | 7.11 | 8.4 |
| 6 .. | 2.6 | 3.0 | 3.6 | 4.0 | 4.6 | 5.0 | 5.6 | 6. | 6.6 | 7.0 | 7.6 | 8.0 | 8.6 | 9.0 | 9.6 | 10.0 |
| 7 .. | 2.11 | 3.6 | 4.1 | 4.8 | 5.3 | 5.10 | 6.5 | 7. | 7.7 | 8.2 | 8.9 | 9.4 | 10.11 | 10.6 | 11.1 | 11.8 |
| 8 .. | 3.4 | 4.0 | 4.8 | 5.4 | 6.0 | 6.8 | 7.4 | 8. | 8.8 | 9.4 | 10.0 | 10.8 | 11.4 | 12.0 | 12.8 | 13.4 |
| 9 .. | 3.9 | 4.6 | 5.3 | 6.0 | 6.9 | 7.6 | 8.3 | 9. | 9.9 | 10.6 | 11.3 | 12.0 | 12.9 | 13.6 | 14.3 | 15.0 |
| 10 .. | 4.2 | 5.0 | 5.10 | 6.8 | 7.6 | 8.4 | 9.2 | 10. | 10.10 | 11.8 | 12.6 | 13.4 | 14.2 | 15.0 | 15.10 | 16.8 |
| 11 .. | 4.7 | 5.6 | 6.5 | 7.4 | 8.3 | 9.2 | 10.1 | 11. | 11.11 | 12.10 | 13.9 | 14.8 | 15.7 | 16.6 | 17.5 | 18.4 |
| 12 .. | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12. | 13.0 | 14.0 | 15.0 | 16.0 | 17.0 | 18.0 | 19.0 | 20.0 |
| 13 .. | 5.5 | 6.6 | 7.7 | 8.8 | 9.9 | 10.10 | 11.11 | 13. | 14.1 | 15.2 | 16.3 | 17.4 | 18.5 | 19.6 | 20.7 | 21.8 |
| 14 .. | 5.10 | 7.0 | 8.2 | 9.4 | 10.6 | 11.8 | 12.10 | 14. | 15.2 | 16.4 | 17.6 | 18.8 | 19.10 | 21.0 | 22.2 | 23.4 |
| 15 .. | 6.3 | 7.6 | 8.9 | 10.0 | 11.3 | 12.6 | 13.9 | 15. | 16.3 | 17.6 | 18.9 | 20.0 | 21.3 | 22.6 | 23.9 | 25.0 |
| 16 .. | 6.8 | 8.0 | 9.4 | 10.8 | 12.0 | 13.4 | 14.8 | 16. | 17.4 | 18.8 | 20.0 | 21.4 | 22.8 | 24.0 | 25.4 | 26.8 |
| 17 .. | 7.1 | 8.6 | 9.11 | 11.4 | 12.9 | 14.2 | 15.7 | 17. | 18.5 | 19.10 | 21.3 | 22.8 | 24.1 | 25.6 | 26.11 | 28.4 |
| 18 .. | 7.6 | 9.0 | 10.6 | 12.0 | 13.6 | 15.0 | 16.6 | 18. | 19.6 | 21.0 | 22.6 | 24.0 | 25.6 | 27.0 | 28.6 | 30.0 |
| 19 .. | 7.11 | 9.6 | 11.1 | 12.8 | 14.3 | 15.10 | 17.5 | 19. | 20.7 | 22.2 | 23.9 | 25.4 | 26.11 | 28.6 | 30.1 | 31.8 |
| 20 .. | 8.4 | 10.0 | 11.8 | 13.4 | 15.0 | 16.8 | 18.4 | 20. | 21.8 | 23.4 | 25.0 | 26.8 | 28.4 | 30.0 | 31.8 | 33.4 |
| 21 .. | 8.9 | 10.6 | 12.3 | 14.0 | 15.9 | 17.6 | 19.3 | 21. | 22.9 | 24.6 | 26.3 | 28.0 | 29.9 | 31.6 | 33.3 | 35.0 |
| 22 .. | 9.2 | 11.0 | 12.10 | 14.8 | 16.6 | 18.4 | 20.2 | 22. | 23.10 | 25.8 | 27.6 | 29.4 | 31.2 | 33.0 | 34.10 | 36.8 |
| 23 .. | 9.7 | 11.6 | 13.5 | 15.4 | 17.3 | 19.2 | 21.1 | 23. | 24.11 | 26.10 | 28.9 | 30.8 | 32.7 | 34 6. | 36.5 | 38.4 |
| 24 .. | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 22.0 | 24. | 26.0 | 28.0 | 30.0 | 32.0 | 34.0 | 36.0 | 38.0 | 40.0 |

## TABLE CONVERTING SQUARE POSTS AND BEAMS TO SUPERFICIAL MEASURE.

Length in Feet.

| Size of Scantling. | 8 | 9 | 10 | 11 | 12 | 14 | 16 | 18 | 20 | 26 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 x 4 | 10.8 | 12.0 | 13.4 | 14.8 | 16. | 18.8 | 21.4 | 24.0 | 26.8 | 34.8 | 134. |
| 5 x 5 | 16.8 | 18.9 | 20.10 | 22.11 | 25. | 29.2 | 33.4 | 37.6 | 41.8 | 54.2 | 209. |
| 6 x 6 | 24.0 | 27.0 | 30.0 | 33.0 | 36. | 42.0 | 48.0 | 54.0 | 60.0 | 78.0 | 300. |
| 7 x 7 | 32.8 | 36.9 | 40.10 | 44.11 | 49. | 57.2 | 65.4 | 73.6 | 81.8 | 106.2 | 409. |
| 8 x 8 | 42.8 | 45.6 | 53.4 | 58.8 | 64. | 74.8 | 85.4 | 96.0 | 106.8 | 138.8 | 534. |
| 9 x 9 | 54.0 | 60.9 | 67.6 | 74.3 | 81. | 94.6 | 108.0 | 121.6 | 135.0 | 175.6 | 675. |
| 10 x 10 | 66.8 | 75.0 | 83.4 | 91.8 | 100. | 116.8 | 133.4 | 150.0 | 166.8 | 216.8 | 834. |
| 11 x 11 | 80.8 | 90.9 | 100.10 | 110.11 | 121. | 141.2 | 161.4 | 181.6 | 201.9 | 283.9 | 1009. |
| 12 x 12 | 96.0 | 108.0 | 120.0 | 132.0 | 144. | 168.0 | 192.0 | 216.0 | 240.0 | 312.0 | 1200. |
| 14 x 14 | 130.8 | 147.0 | 163.4 | 179.8 | 196. | 228.8 | 261.4 | 294.0 | 326.8 | 424.8 | 1634. |

## TABLE CONVERTING FLOOR, ROOF AND STUD SCANTLINGS TO SUPERFICIAL MEASURE.

Length in Feet.

| Size of scant'g. | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 x 1½ | 1.3 | 1.6 | 1.9 | 2. | 2.3 | 2.6 | 2.9 | 3.0 | 3.3 | 3.6 | 3.9 | 4. | 4.3 | 4.6 | 4.9 | 5.0 |
| 3 x 1½ | 1.11 | 2.3 | 2.8 | 3. | 3.5 | 3.9 | 4.2 | 4.6 | 4.11 | 5.3 | 5.8 | 6. | 12.5 | 6.11 | | 7.6 |
| 4 x 1½ | 2.6 | 3.0 | 3.6 | 4. | 4.6 | 5.0 | 5.6 | 6.0 | 6.6 | 7.0 | 7.6 | 8. | 8.6 | 9.0 | 9.6 | 10.0 |
| 5 x 1½ | 3.2 | 3.9 | 4.5 | 5. | 5.8 | 6.3 | 6.11 | 7.6 | 8.2 | 8.9 | 9.5 | 10. | 10.8 | 11.3 | | 12.6 |
| 6 x 1½ | 3.9 | 4.6 | 5.3 | 6. | 6.9 | 7.6 | 8.3 | 9.0 | 9.9 | 10.6 | 11.3 | 12. | 12.9 | 13.0 | 14.3 | 15.0 |
| 7 x 1½ | 4.5 | 5.3 | 6.2 | 7. | 7.11 | 8.9 | 9.8 | 10.6 | 11.5 | 12.3 | 13.2 | 14. | 14.11 | 15.9 | 16.8 | 17.6 |
| 8 x 1½ | 5.0 | 6.0 | 7.0 | 8. | 9.0 | 10.0 | 11.0 | 12.0 | 13.0 | 14.0 | 15.0 | 16. | 17.0 | 18.0 | 19.0 | 20.0 |
| 9 x 1½ | 5.8 | 6.9 | 7.11 | 9. | 10.2 | 11.3 | 12.5 | 13.6 | 14.8 | 15.9 | 16.11 | 18. | 19.2 | 20.3 | | 22.6 |
| 10 x 1½ | 6.3 | 7.6 | 8.9 | 10. | 11.3 | 12.6 | 13.9 | 15.0 | 16.3 | 17.6 | 18.9 | 20. | 21.3 | 22.6 | 23.9 | 25.0 |
| 11 x 1½ | | 8.3 | | 11. | | 13.9 | | 16.6 | | 19.3 | | 22. | | 24.9 | | 27.6 |
| 12 x 1½ | 7.6 | 9.0 | 10.6 | 12. | 13.6 | 15.0 | 16.6 | 18.0 | 19.6 | 21.0 | 22.6 | 24. | 25.6 | 27.0 | 28.6 | 30.0 |
| 13 x 1½ | | 9.9 | | 13. | | 16.3 | | 19.6 | | 22.9 | | 26. | | 31.6 | | 32.6 |
| 14 x 1½ | 8.9 | 10.6 | 12.3 | 14. | 15.9 | 17 6. | 19.3 | 21.0 | 22.9 | 24.6 | 26.3 | 28. | 29.9 | 31.6 | 33.3 | 35.0 |

N.B.—In the odd sizes and lengths the result is given in *full* inches only.

## SCANTLING TO SUPERFICIAL.

Length in Feet.

| Size of scant'g. | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 x 2 | 2. | 2.4 | 2.8 | 3.0 | 3.4 | 3.8 | 4. | 4.4 | 4.8 | 5.0 | 5.4 | 6. | 6.8 | 7.4 | 8. | 8.8 | 9.4 | 10. | 10.8 |
| 3 x 2 | 3. | 3.6 | 4.0 | 4.6 | 5.0 | 5.6 | 6. | 6.6 | 7.0 | 7.6 | 8.0 | 9. | 10.0 | 11.0 | 12. | 13.0 | 14.0 | 15. | 16.0 |
| 4 x 2 | 4. | 4.8 | 5.4 | 6.0 | 6.8 | 7.4 | 8. | 8.8 | 9.4 | 10.0 | 10.8 | 12. | 13.4 | 14.8 | 16. | 17.4 | 18.8 | 20. | 21.4 |
| 5 x 2 | 5. | 5.10 | 6.8 | 7.6 | 8.4 | 9.2 | 10. | 10.10 | 11.8 | 12.6 | 13.4 | 15. | 16.8 | 18.4 | 20. | 21.8 | 23.4 | 25. | 26.8 |
| 6 x 2 | 6. | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12. | 13.0 | 14.0 | 15.0 | 16.0 | 18. | 20.0 | 22.0 | 24. | 26.0 | 28.0 | 30. | 32.0 |
| 7 x 2 | 7. | 8.2 | 9.4 | 10.6 | 11.8 | 12.10 | 14. | 15.2 | 16.4 | 17.6 | 18.2 | 21. | 23.4 | 25.8 | 28. | 30.4 | 32.8 | 35. | 36.4 |
| 8 x 2 | 8. | 9.4 | 10.8 | 12.0 | 13.4 | 14.8 | 16. | 17.4 | 18.8 | 20.0 | 21.4 | 24. | 26.8 | 29.4 | 32. | 34.8 | 37.4 | 40. | 42.8 |
| 9 x 2 | 9. | 10.6 | 12.0 | 13.6 | 15.0 | 16.6 | 18. | 19.6 | 21.0 | 22.6 | 24.0 | 27. | 30.0 | 33.0 | 36. | 39.0 | 42.0 | 45. | 48.0 |
| 10 x 2 | 10. | 11.8 | 13.4 | 15.0 | 16.8 | 18.4 | 20. | 21.8 | 23.4 | 25.0 | 26.8 | 30. | 33.4 | 36.8 | 40. | 43.4 | 46.8 | 50. | 53.4 |
| 11 x 2 | 11. | 12.10 | 14.8 | 16.6 | 17.4 | 19.2 | 22. | 23.10 | 25.8 | 27.6 | 29.4 | 33. | 34.8 | 38.4 | 44. | 47.8 | 51.4 | 55. | 58.8 |
| 12 x 2 | 12. | 14.0 | 16.0 | 18.0 | 20.0 | 22.0 | 24. | 26.0 | 28.0 | 30.0 | 32.0 | 36. | 40.0 | 44.0 | 48. | 52.0 | 56.0 | 60. | 64.0 |

Length of Scantling in Feet.

| | 6 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 x 2½ | 2.6 | 3.4 | 3.9 | 4.2 | 4.7 | 5.0 | 5.5 | 5.10 | 6.3 | 6.8 | 7.6 | 8.4 | 9.2 | 10.0 | 10.10 | 11.8 | 12.6 | 13.4 | 14.2 |
| 3 x 2½ | 3.9 | 5.0 | 5.8 | 6.3 | 6.10 | 7.6 | 8.2 | 8.9 | 9.5 | 10.0 | 11.4 | 12.6 | 13.9 | 15.0 | 16.4 | 17.6 | 18.9 | 20.0 | 21.3 |
| 4 x 2½ | 5.0 | 6.8 | 7.6 | 8.4 | 9.2 | 10.0 | 10.10 | 11.8 | 12.6 | 13.4 | 15.0 | 16.8 | 18.4 | 20.0 | 21.8 | 23.4 | 25.0 | 26.8 | 28.4 |
| 5 x 2½ | 6.3 | 8.4 | 9.5 | 10.5 | 11.6 | 12.6 | | | 15.8 | 16.8 | 18.9 | 20.10 | 22.11 | 25.0 | 27.0 | | 31.3 | 33.4 | |
| 6 x 2½ | 7.6 | 10.0 | 11.4 | 12.6 | 13.9 | 15.0 | 16.3 | 17.6 | 18.9 | 20.0 | 22.6 | 25.0 | 27.6 | 30.0 | 32.6 | 35.0 | 37.6 | 40.0 | 42.6 |
| 7 x 2½ | 8.9 | 11.8 | 13.3 | 14 7 | 15.11 | 17.6 | | | 21 11 | 23.4 | | 29 .2 | | 35.0 | | | 43.9 | 46.8 | |
| 8 x 2½ | 10.0 | 13.4 | 15.0 | 16.8 | 18.4 | 20.0 | | | 25.0 | 26.8 | 30.0 | 33.4 | 36.8 | 40.0 | 43.4 | | 50.0 | 53.4 | 56.8 |
| 9 x 2½ | 11.3 | 15.0 | | 18.9 | | 22.6 | 24.5 | | 28.2 | 30.0 | | 37.6 | | 45.0 | | | 56.3 | 60.0 | |
| 10 x 2½ | 12.6 | 16.8 | | 20.10 | | 25.0 | | | 31.3 | 33.4 | 37.6 | 41.8 | | 50.0 | | | 62.6 | 66.8 | 70.10 |
| 12 x 2½ | 15.0 | 20.0 | 22.6 | 25.0 | 27.6 | 30.0 | 32.6 | 35.0 | 37.6 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 70.0 | 75.0 | 80.0 | 85.0 |

## FLOOR, ROOF AND STUD SCANTLING, REDUCED TO SUPERFICIAL MEASURE.,

| Size, in. | Length in Feet. 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 x 3 | 4.6 | 5.3 | 6. | 6.9 | 7.6 | 8.3 | 9. | 9.9 | 10.6 | 11.3 | 12. | 12.9 | 13.6 | 14.3 | 15. | 15.9 | 16.6 | 17.3 | 18. |
| 4 x 3 | 6.0 | 7.0 | 8. | 9.0 | 10.0 | 11.0 | 12. | 13.0 | 14.0 | 15.0 | 16. | 17.0 | 18.0 | 19.0 | 20. | 21.0 | 22.0 | 23.0 | 24. |
| 5 x 3 | 7.6 | 8.9 | 10. | 11.3 | 12.6 | 13.9 | 15. | 16.3 | 17.6 | 18.9 | 20. | 21.3 | 22.6 | 23.9 | 25. | 26.3 | 27.6 | 28.9 | 30. |
| 6 x 3 | 9.0 | 10.6 | 12. | 13.6 | 15.0 | 16.6 | 18. | 19.6 | 21.0 | 22.6 | 24. | 25.6 | 27.0 | 28.6 | 30. | 31.6 | 33.0 | 34.6 | 36. |
| 7 x 3 | 10.6 | 12.3 | 14. | 15.9 | 17.6 | 19.3 | 21. | 22.9 | 24.6 | 26.3 | 28. | 29.9 | 31.6 | 33.3 | 35. | 36.9 | 38.6 | 40.3 | 42. |
| 8 x 3 | 12.0 | 14.0 | 16. | 18.0 | 20.0 | 22.0 | 24. | 26.0 | 28.0 | 30.0 | 32. | 34.0 | 36.0 | 38.0 | 40. | 42.0 | 44.0 | 46.0 | 48. |
| 9 x 3 | 13.6 | 15.9 | 18. | 20.3 | 22.6 | 24.9 | 27. | 29.3 | 31.6 | 33.9 | 36. | 38.3 | 40.6 | 42.9 | 45. | 47.3 | 49.6 | 51.9 | 54. |
| 10 x 3 | 15.0 | 17.6 | 20. | 22.6 | 25.0 | 27.6 | 30. | 32.6 | 35.0 | 37.6 | 40. | 42.6 | 45.0 | 47.6 | 50. | 52.6 | 55.0 | 57.6 | 60. |
| 11 x 3 | 16.6 | 19.3 | 22. | 24.9 | 27.6 | 30.3 | 33. | 35.9 | 38.6 | 41.3 | 44. | 46.9 | 49.6 | 52.3 | 55. | 57.9 | 60.6 | 63.3 | 66. |
| 12 x 3 | 18.0 | 21.0 | 24. | 27.0 | 30.0 | 33.0 | 36. | 39.0 | 42.0 | 45.0 | 48. | 51.0 | 54.0 | 57.0 | 60. | 63.0 | 66.0 | 69.0 | 72. |

| | Length in Feet. 26 | 28 | 30 | 32 | 36 | 40 | 42 | 45 | 48 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 x 3 | 19.6 | 21. | 22.6 | 24. | 25.6 | 30. | 31.6 | 33.9 | 36. | 37.6 | 41.3 | 45. | 48.9 | 52.6 | 56.3 | 60. | 75. |
| 4 x 3 | 26.0 | 28. | 30.0 | 32. | 34.0 | 40. | 42.0 | 45.0 | 48. | 50.0 | 55.0 | 60. | 65.0 | 70.0 | 75.0 | 80. | 100. |
| 5 x 3 | 32.6 | 35. | 37.6 | 40. | 42.6 | 50. | 52.6 | 56.3 | 60. | 62.6 | 68.9 | 75. | 81.3 | 87.6 | 93.9 | 100. | 125. |
| 6 x 3 | 39.0 | 42. | 45.0 | 48. | 51.0 | 60. | 63.0 | 67.6 | 72. | 75.0 | 82.6 | 90. | 97.6 | 105.0 | 112.6 | 120. | 150. |
| 7 x 3 | 45.6 | 49. | 52.6 | 56. | 58.6 | 70. | 73.6 | 78.9 | 84. | 87.6 | 96.3 | 105. | 113.9 | 122.6 | 131.3 | 140. | 175. |
| 8 x 3 | 52.0 | 56. | 60.0 | 64. | 68.0 | 80. | 84.0 | 90.0 | 96. | 100.0 | 110.0 | 120. | 130.0 | 140.0 | 150.0 | 160. | 200. |
| 9 x 3 | 58.6 | 63. | 67.6 | 72. | 76.6 | 90. | 94.6 | 101.3 | 108. | 112.6 | 123.9 | 135. | 146.3 | 157.6 | 168.9 | 180. | 225. |
| 10 x 3 | 65.0 | 70. | 75.0 | 80. | 85.0 | 100. | 105.0 | 112.6 | 120. | 125.0 | 137.6 | 150. | 162.6 | 175.0 | 187.6 | 200. | 250. |
| 11 x 3 | 71.6 | 77. | 82.6 | 88. | 93.6 | 110. | 115.6 | 123.9 | 132. | 137.6 | 151.3 | 165. | 178.9 | 192.6 | 206.3 | 220. | 275. |
| 12 x 3 | 78.0 | 84. | 90.0 | 96. | 102.0 | 120. | 126.0 | 135.0 | 144. | 150.0 | 165.0 | 180. | 195.0 | 210.0 | 225.0 | 240. | 300. |

# JOINER.

**Measurement.**—To the full length of the timbers add the length of tenons, dovetails, scarfs, and all other waste in conversion ; no timber should be cubed of less than 9 superficial inches in sectional area, and then only for engineering works.

In all superficial work such as floors, ceilings, partitions, walls, &c., for " Labour and Nails," or " Labour only," take the full dimensions, including well-holes, chimney breasts, doorways, windows, &c., which are not to be deducted, except the opening exceeds 36 superficial feet, when one-half the area only is allowed.

King and queen posts should be taken full size without deduction, for waist or waste in cubing or squaring.

*See* The Rules for Measurement mentioned in Carpentry, page 115.

### Memorandum.

The foregoing prices are reckoned at the high rate of **fourpence per foot** for materials.

As the items of material and labour are kept separate, any reduction in the price of material can be allowed for in forming estimates.

The supply of joinery ready for fixing by the special steam joinery works advertised on advt. pages 3 and 20, has simplified the estimating of this branch in contracts. A detailed list of the general lines required a copy of which I have thought worth while to extract from and reprint at end of this trade for reference in N.S.W. Other State lists are kept under separate headings.

### A FAIR DAY'S WORK FOR A GOOD TRADESMAN.

Set and bed 10 to 14 box frames, ordinary.
Fit and hang 7 to 10 window sashes.
Fit and hang 6 to 10 doors.
Fit, hang, and lock 4 to 8 doors.
Set door jambs, 6 to 10 sets.
Fit and hang double slide doors, or fix track for one pair.
Fit and hang single slide doors, 2 pairs.
200 to 400 lin. feet plaster grounds.
125 ft. good, and 250 feet ordinary picture mould.

| | s. | d. |
|---|---|---|
| **Door and casement frames,** beaded and rebated hardwood with moulded deal transomes ; per lineal foot, all materials .. | 0 | 9 |
| Herring bone trussing do. do. .. .. .. | 0 | 6 |
| Ridge and hip roll do. do. .. .. .. | 0 | 4 |
| Rebated laps for lead gutters, each .. .. .. .. .. | 0 | 7 |

## DOOR AND CASEMENTS.

### French Casement Frames, Etc.

*Per super. foot.*

| | s. | d. | s. | d. |
|---|---|---|---|---|
| Hardwood, wrought, rebated and beaded or stop chamfered frames, 5 × 3 with sunk sill and water bar for 2 inch casement .. .. .. .. | 0 | 4 | 0 | 6 |
| Ditto, with moulded transome, ditto.. | 0 | 5 | 0 | 7 |
| Ditto, do., prepared for circular fanlight.. | 0 | 6 | 0 | 8 |
| Ditto with cir. fanlight square inside .. | 0 | 8 | 0 | 10 |

*For French casements see Table of Doors, &c.*

| | | | | |
|---|---|---|---|---|
| Door Frame, 5 × 4 hardwood for entrance hall, with moulded transomes prepared for fanlight and side lights .. .. | 0 | 5 | 0 | 8 |
| Door frame only 5 × 3, mill made (not fixed) | | | each 13 | 6 |
| Ditto, do. do. with transome | | | do. 16 | 6 |
| Ditto, do. do. prepared for circular fanlight .. .. .. | | | 30 | 0 |
| Ditto for side and fanlights .. .. .. | | | 46 | 0 |
| Sunk hardwood sill to 4 last items, add .. .. | | | 3 | 0 |

### Shop Fronts, or Fixed Sashes.

*Small squares, per foot super*

| | Materials. s. | d. | Labour fixed. s. | d. |
|---|---|---|---|---|
| 1½ inch deal ovolo or other moulding | 0 | 2 | 0 | 6 |
| 2 inch deal ovolo do. | 0 | 3 | 0 | 7 |
| 2½ inch deal ovolo do. | 0 | 4 | 0 | 8 |

For cedar add 60 per cent. for material, and 1d. per foot extra for labour.

### Sash Bars.

*Per lineal foot, machine wrought.*

| | s. | d. |
|---|---|---|
| 3 inch, lamb's tongue or ovolo, fitted and fixed .. | 0 | 7 |
| 2 inch do. do. .. | 0 | 5 |
| 1¼ inch do. do. .. | 0 | 3 |

If hand-made add one-fourth ; if in cedar add 60 per cent.

## BOX-FRAMES AND SASHES.

| *Not glazed, per foot super.* | Materials. s. | d. | Labour fixed. s. | d. |
|---|---|---|---|---|
| Deal-cased frames, *hardwood* sunk sills, 1½ in moulded sashes, double hung, brass-cased pullies, patent lines and iron weights .. .. .. | 0 | 10 | 1 | 4 |
| Deal-cased frames *hardwood* sunk sills, 2 inch moulded sashes, double hung, brass cased pullies, &c., as above ... ... | 0 | 11 | 1 | 5 |
| Deal-cased frames, double hung, with 2½ inch sashes, &c., as before .. | 1 | 0 | 1 | 6 |
| Ditto, with semi-circular head and span-drills, to show square inside .. | 1 | 0 | 2 | 0 |
| Ventilator (small), frame 2 × 1½ blades 2 × ½, 3 inches apart .. .. | 0 | 6 | 3 | 6 |
| Venetian deal-cased frames, *hardwood* sunk sills, 1½ inch moulded sashes, double hung, &c., as above .. .. | 1 | 0 | 1 | 4 |
| Ditto, with 2 inch sashes, ditto .. | 1 | 1 | 1 | 6 |
| Ditto, with 2½ inch sashes, ditto ... | 1 | 2 | 1 | 9 |

## Skylights, Fanlights, Etc.

| *Per foot super.* | Materials. s. | d. | Labour fixed. s. | d. |
|---|---|---|---|---|
| 1½ inch deal moulded or bevelled bars .. | 0 | 2½ | 0 | 7½ |
| Ditto with cross-bars .. .. | 0 | 3 | 0 | 9 |
| 2 inch deal moulded or bevelled bars .. | 0 | 3 | 0 | 8 |
| Ditto with cross-bars .. .. | 0 | 3½ | 0 | 8½ |
| For every ½ inch extra thickness, add ... | 0 | 0½ | 0 | 1 |
| Fan-Light, 1½ inch deal, one light .. | 0 | 3 | 0 | 6 |
| 2 inch deal, do. .. | 0 | 4 | 0 | 7 |
| 2½ inch deal, do. .. | 0 | 5 | 0 | 8 |

## Window Linings, Elbows, and Soffits.

| *Per foot super.* | Materials. s. | d. | Labour s. | d. |
|---|---|---|---|---|
| Inch, or 1¼ inch deal, 2 panel square, framed, back linings, elbows or soffits | 0 | 5 | 1 | 0 |
| Bead butt, or moulded, add .. .. | | .. | 0 | 2 |
| Bead flush, or quirk moulded, add .. | | .. | 0 | 2 |
| Each panel above 2, if square, add .. | | .. | 0 | 2 |
| Ditto, if moulded add .. | | .. | 0 | 3 |

| *Per foot super.* | Materials. s. | d. | Labour fixed. s. | d. |
|---|---|---|---|---|
| 1½ inch Venetian or Louvre shutters, secured to box frames .. .. | 0 | 8 | 1 | 4 |
| 1¾ inch do. do. .. | 0 | 9 | 1 | 5 |

For Circular work, see Rules, for measurement.
All fastenings, iron shoes, parliament hinges, &c., extra.

### Framed Grounds.

| *Per foot super.* | Materials. s. | d. | Labour fixed. s. | d. |
|---|---|---|---|---|
| Inch deal framed grounds .. .. | 0 | 4 | 0 | 7 |
| If 1¼ inch deal, add .. .. | 0 | 1 | 0 | 1 |
| 1 inch skeleton grounds, for pilasters, &c. | 0 | 4 | 0 | 6 |
| 1¼ inch ditto ditto .. | 0 | 5 | 0 | 7 |
| 1½ inch ditto ditto .. | 0 | 6 | 0 | 8 |

### Door Linings.

| *Per foot super.* | | | | |
|---|---|---|---|---|
| 1¼ inch deal, single rebated .. .. | 0 | 5 | 0 | 7 |
| 1¼ inch square framed 2 panel jambs, and 1 panel head, single rebated .. | 0 | 5 | 1 | 0 |
| Ditto, bead butt, bead flush or moulded.. | 0 | 5 | 1 | 1 |
| Ditto, reed flush, or raised moulded .. | 0 | 5 | 1 | 2 |
| For extra panel or double rebated, add .. | 0 | 0 | 0 | 1 |
| If 1½ inch, add .. .. .. | 0 | 1 | 0 | 1 |

Example.—Required the cost of 1½ inch deal double rebated door linings upon one inch deal framed grounds.

Item 1 of framed grounds, and item 1 and 5 of door linings, viz :—

| | s. | d. |
|---|---|---|
| Materials, Grounds, 4d. ; Linings, 5d. ... ... ... | 0 | 9 |
| Labour, do. 7d. ; do. 8d. ... ... .. | 1 | 3 |

Cost price per sup. foot, 2s.

**Wood Carving.**—The cost of carving in cedar is almost the same as in Sydney or Brisbane freestone. See index.

*Carving in Blackwood* the same as for Spring Bay stone.

*Clear Pine Carving* about the same as for Oamaru freestone.

Colour.—The lighter the colour of the ornament, or enrichment the more readily is any defect observed. For this reason a Corinthian capital which might be passable if carved in cedar or blackwood, would look coarser in clear pine, and would be scarcely passable in plaster of Paris.

DEAL PANELLED AND OTHER DOORS.—*All Materials, per foot super.*

| *Materials reckoned at 4d. per sup. foot and Joiners' wages at 15d. per hour.* | 1 inch. s. d. | 1¼ inch. s. d. | 1½ inch. s. d. | 1¾ inch. s. d. | 2 inch. s. d. | 2½ inch. s. d. |
|---|---|---|---|---|---|---|
| Ledged doors, traps and flaps, T. G. and beaded ... | 0 9 | 0 10 | 0 11 | ..... | ..... | ..... |
| Ledged and braced, or folding, or in 2 heights ... | 0 10 | 0 11 | 1 0 | ..... | ..... | ..... |
| Dwarf doors, 1 panel moulded and square, including framed fronts... ... ... ... ... ... | 1 2 | 1 3 | 1 4 | ..... | ..... | ..... |
| Skeleton doors, 4 panels flush for covering ... ... | ..... | 1 2 | 1 4 | 1 6 | 1 8 | ..... |
| Closet doors, 2 or 3 panel square ... ... ... | 1 1 | 1 2 | 1 3 | ..... | ..... | ..... |
| Ditto, four panel moulded and square ... ... | 1 3 | 1 4 | 1 5 | ..... | ..... | ..... |
| 4 panel doors, framed and ledged ... ... ... | ..... | 1 3 | 1 4 | 1 6 | 1 8 | 2 0 |
| Ditto, bead butt, or moulded and square ... | ..... | 1 4 | 1 5 | 1 7 | 1 9 | 2 1 |
| Ditto, double moulded ... ... ... ... | ..... | 1 5 | 1 6 | 1 8 | 1 10 | 2 2 |
| Ditto, folding doors with raised panels ... ... | ..... | ..... | 1 9 | 1 11 | 2 1 | 2 4 |
| Ditto, bolection or raised moulded ... ... ... | ..... | 1 6 | 1 7 | 1 9 | 1 11 | 2 2 |
| If 6 panel doors, add to 4 panel doors ... ... ... | ..... | ..... | 0 2 | 0 2 | 0 2 | 0 2 |
| If 8 panel door ditto ... ... ... | ..... | ..... | ..... | 0 4 | 0 4 | 0 4 |
| 8 panel folding doors with raised moulding ... ... | ..... | ..... | 2 0 | 2 3 | 2 6 | 2 9 |
| 6 panel doors, raised panels and raised mouldings ... | ..... | ..... | 2 0 | 2 3 | 2 6 | 2 9 |
| Sash doors, 4 or 6 lights, lower panel moulded (glazed) | ..... | ..... | 1 3 | 1 4 | 1 6 | ..... |
| Sash doors with raised mouldings, upper panel fluted plate glass (1 light) ... ... ... ... ... | ..... | ..... | ..... | 2 0 | 2 2 | 2 4 |
| Sash doors, raised mouldings and margin lights (glazed) | ..... | ..... | 1 8 | 1 10 | 2 0 | 2 2 |
| French casements, moulded and glazed ... ... | ..... | ..... | 1 6 | 1 8 | 1 10 | 2 0 |
| French casements, raised mouldings (glazed)... ... | ..... | ..... | 1 10 | 2 0 | 2 2 | 2 4 |
| Ditto, ditto, and circular glass ... | ..... | ..... | 2 0 | 2 2 | 2 4 | 2 6 |
| Ditto, raised panel, moulded and circular glass ... | ..... | ..... | 2 2 | 2 4 | 2 6 | 2 8 |

### Example per Table.—Cost of Cedar Door.

| | £ | s. | d. |
|---|---|---|---|
| 4 panel double, raised moulded door, 7ft. x 3ft. x 1¾in., as per Table. 21 sup. ft., at 1s. 9d. | 1 | 6 | 9 |
| Add 80 per cent. for cost in cedar | 1 | 1 | 5 |
| Price, without furniture, varnishing, or hanging | 2 | 8 | 2 |

### Partitions.

*Per foot super.*

| | Materials only. s. | d. | Labour fixed. s. | d. |
|---|---|---|---|---|
| 1 in. machine wrought T. and G. vertical flooring boards (6 x 1), with centre ledge and grooved 3 x 2 head rail, next ceiling, secured at foot with 6 inch torus skirting | 0 | 4½ | 0 | 1½ |
| 1½ inch panelled partition, single moulded | 0 | 6 | 1 | 0 |
| Ditto, moulded both sides | 0 | 6 | 1 | 1 |
| 2 inch, square-framed partition | 0 | 8 | 1 | 1 |
| Ditto, bead butt, or moulded and square | 0 | 8 | 1 | 2 |
| Ditto, moulded both sides | 0 | 8 | 1 | 3 |
| If raised moulded, add | 0 | 0 | 0 | 1 |

### Counters.

*Per foot super.*

| | | | | |
|---|---|---|---|---|
| 1 inch deal top, glued and blocked | 0 | 5 | 0 | 6 |
| 1¼ inch ditto do. | 0 | 6 | 0 | 7 |
| 1¼ inch deal fronts, framed square | 0 | 5 | 0 | 6 |
| Ditto do. moulded | 0 | 5 | 0 | 7 |
| Morticed clamps, per foot run | 0 | 1½ | 0 | 6 |
| Tongued heading joints, per foot run | 0 | 1½ | 0 | 4½ |
| Mitres to clamps, each | 0 | 0 | 0 | 8 |
| Fitting and hanging flaps, each | 0 | 0 | 1 | 0 |

**Artesian Boring Poles,** about 18 ft. x 2¼ ins. diameter when turned, made of yellow wood or spotted gum (painted with read lead, 3s.), and packed in bundles at Brisbane or Sydney, per 100 lineal feet, 21s.

These poles or rods used in the Canadian pole system of boring have entirely superseded the iron rods formerly used in England for this purpose. The rods are not suitable for twisting, but will probably bear a lifting strain of 12 tons, or about one-fourth of the breaking strain as given on page 14 for blue gum.

## PANELLING, Etc.

*Per foot super.*

| | Materials. s. d. | Labour fixed. s. d. |
|---|---|---|
| 1¼ inch deal, framed, rebated and beaded .. .. | 0 5 | 1 2 |
| Inch and 1¼ inch, ditto, splayed .. .. .. .. | 0 5 | 1 3 |
| Inch and 1¼ inch boxings for sliding shutter, or sashes, double hung, including grooves, beads, fillets, &c.. . | 0 5 | 1 6 |

### Panelling.—Wrought one face.

| | | |
|---|---|---|
| 1¼ inch, moulded, bead butt or bead flush .. .. | 0 5 | 0 8 |
| If less than 3ft. panels, or raking to stairs, add .. .. | 0 1 | 0 2 |
| If raised moulded, add .. .. .. .. .. | 0 1 | 0 2 |

Mock panelling about 40 per cent. less for labour.
For cedar or circular work, see Index.

### Framed Panelling, double-faced, 3 feet panels.

| | | |
|---|---|---|
| 1¼ inch Moulded of bead flush and square .. .. | 0 5 | 1 2 |
| Bead flush and bead butt .. .. .. .. .. | 0 5 | 1 3 |
| For every ¼ inch thick, add .. .. .. .. | 0 1 | 0 1 |
| 1½ inch ditto circular openings .. .. .. .. | 1 0 | 2 0 |

## GATES AND COACH-HOUSE DOORS.

*Per foot super.*

| | Materials. s. d. | Labour only. s. d. |
|---|---|---|
| 2 inch deal, framed and braced, filled in with inch deal, tongued and beaded .. .. .. .. .. | 0 8 | 1 0 |
| 2½ inch ditto, with 1½ inch framed rails and braces, filled in with inch deal, rebated and beaded .. .. | 0 10 | 1 2 |
| 2 inch deal, palisade gates, lower part bead butt, or bead flush and square, upper part 1¼ inch palisades .. | 0 7 | 1 1 |
| 2½ inch ditto. do. .. .. .. .. .. | 0 9 | 1 3 |
| 2 inch deal, 6 panel gates, bead butt or bead flush and square .. .. .. .. .. .. | 0 9 | 1 8 |
| 2½ inch ditto. do. .. .. .. .. .. | 0 10 | 1 10 |
| If 3 inch deal gates, add on the 2½ inch .. .. .. | 0 2 | 0 2 |
| If framed with a wicket, add .. .. .. .. | 0 1 | 0 2 |
| Hanging 12 panel heavy folding, grand entrance doors, say 6ft. x 12ft. x 2½ inch, with 3 pairs heavy hinges | | £2 10 0 |

Hinges and other ironmongery to be charged extra.

## STAIRCASES.

### Water Closets.

*Per foot super.*

| | Materials s. | Materials d. | Labour fixed. s. | Labour fixed. d. |
|---|---|---|---|---|
| 1¼ inch deal seat, 1 in. riser, and bearer | 0 | 5 | 0 | 8 |
| Ditto, framed and bead top, with mortice clamped flap .. .. .. | 0 | 5 | 0 | 11 |
| 1 inch deal, bead flush, framed front .. | 0 | 5 | 0 | 9 |
| Moulded nosing, per foot run .. | 0 | 1 | 0 | 2 |
| Cutting and dishing holes in deal, each | 0 | 0 | 1 | 3 |
| Ditto, for pull, including beads, do. ... | 0 | 3 | 2 | 0 |

For cedar or circular work, see Rules for measurement.

### Staircases.

*Complete, per storey.*

| | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| Common stairs, close strings, 1 flight .. .. .. | 3 | 0 | 0 | to | 4 | 0 | 0 |
| Dog leg stairs, open strings .. | 6 | 0 | 0 | | 8 | 0 | 0 |
| Stairs with open strings, return nosings, continued handrail steps about 3½ feet long, 12 ft. rooms .. .. .. | 18 | 6 | 0 | | 20 | 0 | 0 |
| Geometrical stairs with single rail, steps about 5 feet long, ditto .. | 26 | 0 | 0 | | 32 | 0 | 0 |
| Ditto, ditto per step | 1 | 5 | 0 | | 1 | 12 | 0 |

### Staircases.

*Per foot super.*

| | Materials s. | Materials d. | Labour fixed s. | Labour fixed d. |
|---|---|---|---|---|
| Inch deal wrought steps, risers, and two carriages .. .. .. | 0 | 6 | 0 | 8 |
| 1¼ inch wrought deal steps, risers, and two carriages .. .. .. | 0 | 7 | 0 | 8 |
| Ditto, glued and blocked, with moulded nosings .. .. .. .. | 0 | 8 | 0 | 11 |
| Ditto, mitred to cut string and dove-tailed for balusters .. .. | 0 | 8 | 1 | 2 |
| Ditto, do. bracketed .. .. | 0 | 8 | 2 | 4 |
| 1¼ squared framed spandrels .. .. | 0 | 6 | 0 | 10 |
| Ditto moulded or bead butt .. .. | 0 | 7 | 1 | 0 |

## STAIRCASES.

| *Items, each.* | Materials. s. | d. | Labour. s. | d. |
|---|---|---|---|---|
| Quarter curtail step glued upright ... | 1 | 9 | 6 | 3 |
| Proper curtail step and riser .. .. | 3 | 0 | 30 | 0 |
| Returned moulded and mitred nosings .. | 0 | 3 | 2 | 6 |
| Ditto, circular .. ... .. | 0 | 4 | 4 | 0 |
| Plain cut brackets .. .. .. | 0 | 4 | 2 | 6 |
| Housings to wall string for step and riser | 0 | 0 | 0 | 6 |
| Ditto to winders with moulded nosings.. | 0 | 0 | 1 | 6 |
| Notching outer string, per step .. | 0 | 0 | 0 | 6 |

## String Boards.

| *Per foot super.* | | | | |
|---|---|---|---|---|
| 1¼ inch plain wall string .. .. | 0 | 5 | 0 | 9 |
| 1½ inch ditto ditto .. .. | 0 | 6 | 0 | 10 |
| 2 inch ditto ditto .. .. | 0 | 8 | 1 | 0 |
| If moulded, add .. .. .. | 0 | 1 | 0 | 2 |
| 1¼ inch deal, plain outside string, rebated, beaded and framed to newels .. | 0 | 5 | 1 | 0 |
| Ditto sunk and beaded, or moulded .. | 0 | 5 | 1 | 2 |
| Ditto, and mitred to risers .. .. | 0 | 5 | 1 | 3 |

Writhed strings, or facia, 4 times the price of straight for labour and twice for material. For cedar and circular work, see Index.

## Hand Rails, Balusters, Newels, Etc.

| *Per lin. foot.* | Materials. s. | d. | Labour fixed s. | d. |
|---|---|---|---|---|
| Cedar oval 4-inch handrail sunk for balusters .. .. .. | 0 | 6 | 1 | 6 |
| Deal moulded handrail ditto .. | 0 | 3 | 0 | 9 |
| Ditto do. ramped .. .. | 0 | 6 | 2 | 0 |
| Ditto Swan-neck, or level circular .. | 0 | 9 | 2 | 6 |
| Ditto, solid writhed .. .. ... | 1 | 0 | 6 | 0 |
| Half-rails, two-thirds of the whole. | | | | |
| Cedar handrail 3" × 1½, oval polished to spiral stairs, screwed to iron band .. | | | 4 | 6 |
| Ramps to same .. .. .. | | | 7 | 0 |
| Cedar handrail 5 × 4, elaborately moulded, fixed and polished .. | | | 8 | 6 |
| Ramps for ditto ditto.. .. | | | 17 | 0 |

### Newels and Balusters.

| | Materials. s. d. | Labour fixed. s. d. |
|---|---|---|
| Newel 4-in. stop chamfered with moulded cap and plinth | 0 8 | 2 0 |
| Inch square bar balusters, each | 0 2 | 0 8 |
| Fixing iron newels, each | 0 0 | 4 0 |
| Ditto iron balusters, each | 0 0 | 1 6 |
| Ditto stays, do. | 0 0 | 0 9 |

Iron newels, balusters, and stays, charged extra at per lb.

*Per super foot.*

| | Materials. s. d. | Labour fixed. s. d. |
|---|---|---|
| Base, surbase, double architraves, cornice, and skirting mouldings | 0 8 | 1 0 |
| Ditto, if worked by hand | 0 9 | 1 6 |
| Reed mouldings in pilasters, &c. | 0 6 | 0 9 |
| Church Gothic cornices, worked by hand | 1 0 | 2 0 |

### Patent Revolving Shutters.

*Per foot super.*

| | s. d. |
|---|---|
| Steel self-revolving safety iron shutters for shop fronts and private houses, fixed | 5 0 |
| Self-coiling revolving wood shutters, ditto | 3 3 |
| Interlocking self-coiling steel shutters, with springs and boxes, fireproof and burglar proof | 5 0 |
| Self-coiling wood revolving shutters with springs and boxes or weights, early English registered design with chequered pattern in red deal, height of openings from 8 ft. to 15 ft. | 3 0 |

(*See* advt., Brady & Co.) Page 7, advt.

### Columns and Pilasters.

*Per foot super.*

| | Materials. s. d. | Labour fixed. s. d. |
|---|---|---|
| 1¼ inch deal diminished columns, glued and blocked, not less than 14 inches diameter at the base | 0 10 | 2 0 |
| Ditto, from 14 to 10 inches, do. | 0 11 | 2 4 |
| Ditto, under 10 inches do. | 1 0 | 2 8 |
| If 1½ inch deal, add | 0 1 | 0 2 |
| 1¼ inch plain pilasters, glued and blocked | 0 6 | 0 9 |
| 1½ in. do. do. | 0 7 | 0 10 |

| *Per foot super.* | Materials. s. | d. | Labour fixed. s. | d. |
|---|---|---|---|---|
| Capitals and bases prepared for carvers or turners, glued in thicknesses, not exceeding 3 ins. thick .. .. | 2 | 0 | 2 | 4 |
| Ditto glued upright and blocked for do. | 2 | 4 | 3 | 0 |

Reeds or flutes to columns, one-half more.

TURNING to be charged extra. For prices see index.

## FRIEZE AND CRADLING.

| *Per foot super.* | Materials. s. | d. | Labour fixed s. | d. |
|---|---|---|---|---|
| Cradling, to entablature, 1½ in. thick .. | 0 | 4 | 0 | 6 |
| Inch tongued frieze to shop fronts, &c... | 0 | 4 | 0 | 8 |
| 1¼ inch ditto ... .. | 0 | 5 | 0 | 10 |
| Ditto, Doric friezes with triglyphs, &c. | 0 | 5 | 2 | 1 |
| Straight mitres, each .. ... | 0 | 0 | 1 | 0 |
| Circular ditto ... ... | 0 | 0 | 1 | 8 |
| Plancier, both edges rounded, per l. ft... | 0 | 1 | 0 | 2 |
| Ditto, moulded do. .. | 0 | 1 | 0 | 3 |

Reeds or flutes, as in pilasters.

N.B.—The soffit and plancier must be taken as deal, wrought, and framed.

## SINGLE MOULDINGS.

| *Per foot run fixed.* | Materials. s. | d. | Labour. s. | d. |
|---|---|---|---|---|
| ¾ inch and inch common O.G. astragal, &c. | 0 | 0½ | 0 | 0½ |
| Ditto, quirked O.G. ovolo, &c. ... | 0 | 0½ | 0 | 1 |
| Inch rounded or moulded nosing ... | 0 | 0 | 0 | 1½ |
| Beaded capping, with O.G. under ... | 0 | 1 | 0 | 3 |
| Narrow skirting grounds ... | 0 | 1 | 0 | 1½ |
| Ditto grooved or rebated ... | 0 | 1 | 0 | 2 |
| Square angle staff, rebated ... | 0 | 0½ | 0 | 2½ |
| 1¼ inch angle bead .. ... | 0 | 0½ | 0 | 2 |
| Glued and mitred borders to hearths, &c. | 0 | 1 | 0 | 6 |
| 1¼ and 1½ inch common O.G. astragal, torus, ovolo, or bead, fixed... ... | 0 | 0½ | 0 | 1½ |
| Single-faced architraves, 4 or 5 inches wide ... ... ... ... | 0 | 1½ | 0 | 4 |
| Deal moulded hat rail, per foot run ... | 0 | 2 | 0 | 6 |

*Including plugging, fillets, and backings.*
*Machine made and fixed complete.*

| Per lineal foot. | 4 inch. s. d. | 5 inch. s. d. | 6 inch. s. d. | 7 inch. s. d. | 8 inch. s. d. |
|---|---|---|---|---|---|
| Skirtings beaded or moulded | 0 3 | 0 4 | 0 5 | 0 6 | 0 7 |
| Architraves single faced .. | 0 4 | 0 5 | 0 6 | | |
| Ditto, double faced .. | .. | .. | .. | 0 9 | 0 10 |
| | 9 inch. | 12 inch | 14 inch. | 16 inch. | 18 inch |
| Skirtings double sunk and moulded .. .. .. | 0 6 | 0 9 | 1 0 | 1 1 | 1 2 |
| Ditto plain or moulded .. | 0 5 | 0 6 | | | |

If made by hand add one-fourth to these prices.

Fixing machine-wrought architraves or skirtings, costs about 2d. per lineal foot, including plugging and mitering, or scribing at corners.

### Back Door and Fanlight.

*Fixed complete.*

| | £ | s. | d. |
|---|---|---|---|
| 1¾ inch pine, bead butt and square, glazed 2 light fanlight, 24 sup. feet at 1s. 6d. .. | 1 | 16 | 0 |
| 5 × 3 hardwood rebated frame with transome | 0 | 18 | 0 |
| 4 inch architrave 6s. ; furniture, painting and hanging, 24s. .. .. .. | 1 | 10 | 0 |
| Cost price .. | £4 | 4 | 0 |

### Front Door and Fanlight.

*Fixed complete.*

| | £ | s. | d. |
|---|---|---|---|
| 2 inch pine front door, double raised moulded with transome light, 26 oz. glass, glazed and swivel hung. 27 sup. feet at 2s. .. | 2 | 14 | 0 |
| 5 × 3 hardwood rebated and beaded frame and transome rail fixed and painted .. .. | 1 | 0 | 0 |
| 23 lin. feet, 5 inch sing. faced architrave fixed | 0 | 8 | 0 |
| Graining oak and varnishing, 2 coats, 8 yds .. | 1 | 0 | 0 |
| Furniture, ordinary, and hanging door, &c. .. | 0 | 18 | 0 |
| Cost price .. | £6 | 0 | 0 |

### Inside Door, Jambs, &c.

| *Fixed complete.* | £ | s. | d. |
|---|---|---|---|
| 1½ inch cedar double moulded, 4 panel door, 7 ft. x 3 ft. . . | 2 | 0 | 0 |
| Jamb linings, cedar, 10½ x 1½, double rebated and fixed, including plugging | 1 | 12 | 0 |
| Cedar 5 inch single faced architraves, 2 sets secured to plugs complete | 1 | 6 | 0 |
| 9 sup. yards spirit varnishing, 11s. ; furniture, 12s., hanging, 5s. | 1 | 8 | 0 |
| Cost price | £6 | 6 | 0 |

## SUMMARY OF PRESENT RULING PRICES.

### Sundries.

| | per 100 ft. |
|---|---|
| Rough boarding, ¾in. Colonial Pine, for roof lining | 20 0 |
| Ditto. do. 1in. Oregon do. do. | 25 0 |
| Ridge Roll, 2½ x 2, Pine, per foot run | 0 3 |
| Batten Fencing, up to 5ft. high, | 3 2 |
| Split Paling Fencing, 5 ft. high, with 1¼in. gal. hoop iron, top and bottom, per rod | 18 9 |
| Sawn Paling Fencing do. do. | 18 0 |
| Weatherboard Fencing, 6 ft. high, per ft. run | 2 8 |
| Corrugated Gal. Iron Fencing, 6 ft., 3 rails | 4 5 |

### FITTINGS AND JOINERY FIXED—Per ft. super.

| | |
|---|---|
| **Jamb-linings,** 1½in. door, rebated in pine | 0 10½ |
| Ditto with transome | 1 1½ |
| Ditto in Cedar | 1 3 |
| Ditto ditto. with transom | 1 6 |
| | per ft. run |
| **Architraves,** 5in. and 6in. x 1½in., moulded Redwood, 7d. ; cedar | 0 10 |
| Skirting, 9 x 1, moulded Redwood, 6d. ; cedar | 0 9 |
| Ditto 12 x 1¼, Redwood, 11d. ; Cedar | 1 3 |
| Grounds, 3in. x ¾in., wrought Deal and Cedar plugs, fixed | 0 2½ |
| Wood Mouldings, Redwood, at per inch girt | 0 1½ |
| Ditto Cedar do. do. | 0 2 |
| American Shelving, dressed and fixed | 0 7 |
| Flooring, 4 x 1, T. & G., Hardwood, laid | 20 0 |
| **Lining,** for ceilings ¾in. Baltic, T. & G., beaded or V. jointed | 18 0 |
| ¾in. Colonial Pine do. do. | 23 6 |
| ¾in. Kauri do. do. | 26 0 |
| ¾in. Cedar do. do. | 55 0 |

## CHURCH FITTINGS.

### Church Ventilators.

| | Materials. s. | d. | Labour. s. | d. |
|---|---|---|---|---|
| *Ventilator for gable*, 3 ft. sides, equilateral triangle, with 4 × 2½ hardwood frame fixed in 4½ inch reveals and filled with 6 × 1 Louvre boards, all clean wrought | 4 | 0 | 18 | 0 |
| *Ventilator* (*2nd rate*) *for side of roof*, 3 feet equilateral triangle, and 4 ft. ridge-roll frame 2 × 1½ nailed together, and filled with 3½ × ¾ Louvre, sides covered with redwood T. and G. flooring .. .. | 4 | 0 | 16 | 0 |
| *Ventilator for church ceiling*, 3',4" *diam.* 1¼ in. pine, cut with 4 trefoils and centre quatrefoil openings, 3 in. bold moulding planted round edge in segments fixed complete .. .. .. .. | 10 | 6 | 18 | 0 |
| | s. | d. | s. | d. |
| *Front of Pews*, 8 ft. × 2',9" × 1½ in. stiles muntins and rails stop chamfered on face, also 6 diagonal V grooved 1 in. panels, flush and chamfered at back per foo tsuper .. .. .. | 0 | 6 | 1 | 0 |
| *Pew backs*, 8 ft. × 20 ins. × 1½ in. face stop chamfered, three 1 in. bead and flush panels, per foot super .. .. | 0 | 6 | 0 | 11 |
| *Seat for aitto*, 8 ft. × 12 ins. × 1½ in., with rounded edge, supported at ends and by 2 seats, per foot run .. .. | 0 | 6 | 0 | 6 |
| *Pew backs open*, as before, without panels | 0 | 5 | 0 | 10 |
| *Church pews complete*, 9 feet long, similar to the above with stall ends (curved tops and carved number, 3',2½ × 15½ ins. × 3 ins. fixed on soles, 17 × 4 × 4, secured to floor, backs, seat, &c., as before .. | 30 | 0 | 50 | 0 |

**Gothic Doors** and Windows are often mill made, the price being similar to circular headed doors, &c. ; if hand made they cost about 50 per cent. more than if square headed.

**Pulpits, Reading Desks,** and **Rostrums** are too varied in design to give any definite prices ; the rough framing, panelling, cornice and other mouldings, carving, &c , may be obtained from items under these headings. See index.

## SCHOOL FURNITURE.

| | Sydney prices. £ | s. | d. |
|---|---|---|---|
| Forms 17 ins. high, tops 9 ins. wide, p. lin. foot | 0 | 3 | 6 |
| Ditto, 15 ins. high, tops 8 ins. wide do. .. | 0 | 3 | 0 |
| Ditto, 12 ,, ,, 7 ins. wide, for infants, with cedar backs 3 × 1¼ ins., supported with iron stays, ⅞ × ⅜, not more than 4 feet apart | 0 | 6 | 0 |
| Desks 26 ins. high, 15 ins. wide, screwed to iron standards which are screwed to floor, 5 feet apart, per lin. foot .. .. .. | 0 | 3 | 0 |
| Ditto, 24 ins. high, by 14 ins. wide ditto.. | 0 | 2 | 6 |
| Tablets 24 ins. × 18 ins. × ¾ inch each.. | 0 | 6 | 0 |
| Ditto, 18 ins. × 16 ins. × ¾ inch do.. | 0 | 5 | 0 |
| Book press 3 ft. wide, 4 ft. high, and 18 ins. deep | 5 | 0 | 0 |
| Strong wooden chairs, polished cedar each .. | 0 | 10 | 0 |
| Table, polished cedar, 3 ft. × 2 ft, with 2 drawers and turned legs.. .. .. .. | 3 | 10 | 0 |
| Ditto, 5 ft. × 3 ft. ditto .. | 5 | 10 | 0 |
| Black board, 4 ft. × 3 ft. × 1¼ thick, stained black .. .. .. .. .. | 1 | 1 | 0 |
| Easel for board, 5 ft. 6 ins. high, varnished, 2 coats | 1 | 7 | 6 |
| Iron hat pegs, 9 ins. apart on 2½ × 1 beaded batten, secured to wall and painted 3 coats, per lin. foot .. .. .. .. | 0 | 0 | 3 |
| Light folding tripod (to show maps on) 7 ft. 6 in. high, with 1½ in. round legs, hinged to a 2 in. top .. .. .. .. .. | 1 | 17 | 6 |
| Pointer, 5 ft. × 1¼ in. diam., tapering to ½ in diam | 0 | 3 | 6 |
| Beaded batten, 3 × ¾, fixed to wall to hang maps and tablets on, painted 3 coats, per lin. ft. .. | 0 | 0 | 2 |

## TURNERS' WORK.

Turners' wages 1s. 4d. per hour, and Clear Pine 5d. per sup. foot.

| *Per pair.* | Labour only. s. | d. | Clear Pine. s. | d. |
|---|---|---|---|---|
| Tuscan base and Capital for 6 inch column .. | 2 | 6 | 1 | 0 |
| Ditto ditto 9 inch column .. | 3 | 6 | 2 | 6 |
| Ditto ditto 12 inch column .. | 4 | 6 | 5 | 0 |
| Doric base and capital for 6 inch column .. | 3 | 6 | 1 | 0 |
| Ditto ditto 9 inch do. .. | 4 | 6 | 2 | 6 |
| Ditto ditto 12 inch do. .. | 5 | 6 | 5 | 0 |
| Base and cap for 4 inch verandah post .. | 3 | 0 | 0 | 8 |

## TURNER'S WORK—*Continued.*

| | *Each.* | Labour only. s. | d. | Clear Pine s. | d. |
|---|---|---|---|---|---|
| Ionic base for 6 inch column (major diam.) | .. | 3 | 4 | 0 | 8 |
| Ditto 9 inch column | .. .. | 4 | 0 | 1 | 6 |
| Ditto 12 inch column | .. .. | 4 | 8 | 3 | 0 |
| Corinthian or Composite base for 6 in. column | | 4 | 0 | 0 | 8 |
| Ditto ditto 9 in. do.. | | 5 | 0 | 1 | 6 |
| Ditto ditto 12 in. do.. | | 6 | 0 | 3 | 0 |
| Ditto capital for carving 6 in. do.. | | 2 | 8 | 1 | 6 |
| Ditto ditto 9 in. do.. | | 4 | 8 | 3 | 0 |
| Ditto ditto 12 in. do.. | | 6 | 8 | 6 | 0 |
| Newels 3 in. diameter and 4 feet long | .. | 1 | 6 | 1 | 4 |
| 4 in. ditto ditto.. | .. | 2 | 6 | 2 | 6 |
| 5 in. ditto ditto.. | .. | 3 | 0 | 3 | 0 |
| 6 in. ditto ditto.. | .. | 5 | 0 | 4 | 0 |
| 8 in. ditto ditto.. | ... | 7 | 6 | 7 | 6 |
| 10 in. ditto ditto.. | .. | 13 | 6 | 12 | 0 |
| Balusters ordinary for staircases, 2 in. diam. | .. | 0 | 8 | 0 | 3 |
| Ditto best ditto ditto | .. | 1 | 0 | 0 | 3½ |
| Ditto, best with spiral column, ditto | .. .. | 4 | 0 | 0 | 4 |
| Ditto for parapets, loggias, &c., 3 in diameter and 12 ins. high | .. .. .. | 1 | 0 | 0 | 4 |
| Ditto 4½ in. diameter and 18 ins. high | ... | 2 | 0 | 0 | 11 |
| Ditto 6 in. do. and 24 ins. do. | .. | 3 | 4 | 2 | 0 |
| Solid ball for finial, &c. 4 ins. diameter | .. | 2 | 8 | 0 | 6 |
| Ditto do. 8 ins. do. | .. | 4 | 0 | 1 | 8 |
| Ditto do. 12 ins. do. | .. | 5 | 4 | 4 | 0 |

ANGLES, Degrees and tenths for opening of a Two-foot Rule, in inches and quarters.

| Ins. | Degrees | Ins. | Degrees | Ins. | Degrees | Ins. | Degrees | Ins. | Degrees |
|---|---|---|---|---|---|---|---|---|---|
| ¼ | 2.4 | 4¼ | 20.4 | 8 | 39.0 | 11¾ | 58.6 | 15½ | 80.4 |
| ½ | 3.6 | ½ | 21.6 | ¼ | 40.2 | 12 | 60.0 | ¾ | 82.0 |
| ¾ | 4.8 | ¾ | 22.8 | ½ | 41.5 | ¼ | 61.4 | 16 | 83.6 |
| 1 | 6.0 | 5 | 24.0 | ¾ | 42.8 | ½ | 62.8 | ¼ | 85.2 |
| ¼ | 7.2 | ¼ | 25.3 | 9 | 44.0 | ¾ | 64.2 | ½ | 86.9 |
| ½ | 8.4 | ½ | 26.5 | ¼ | 45.3 | 13 | 65.6 | ¾ | 88.5 |
| ¾ | 9.6 | ¾ | 27.7 | ½ | 46.6 | ¼ | 67.0 | 17 | 90.2 |
| 2 | 10.8 | 6 | 29.0 | ¾ | 47.9 | ½ | 68 5 | ¼ | 91.9 |
| ¼ | 12.0 | ¼ | 30.2 | 10 | 49.2 | ¾ | 69.9 | ½ | 93.6 |
| ½ | 13.2 | ½ | 31.4 | ¼ | 50.6 | 14 | 71.4 | ¾ | 95.4 |
| ¾ | 14.4 | ¾ | 32.7 | ½ | 51.9 | ¼ | 72.9 | 18 | 97.2 |
| 3 | 15.6 | 7 | 33.9 | ¾ | 53 2 | ½ | 74.3 | ¼ | 99.0 |
| ¼ | 16.8 | ¼ | 35.2 | 11 | 54.6 | ¾ | 75.8 | ½ | 100.8 |
| ½ | 18.0 | ½ | 36.4 | ¼ | 55.9 | 15 | 77.4 | ¾ | 102.7 |
| ¾ | 19.2 | ¾ | 37.7 | ½ | 57.3 | ¼ | 78.9 | 19 | 104.7 |

N.B.—The tenth of 1 degree varies from one-fiftieth to one-eightieth of an inch.

## FLOORING AND LINING.

| FLOORING. Best Quality. | | | Per 100ft. super. 1st | |
|---|---|---|---|---|
| | | | s. | d. |
| Hardwood, T. & G., | 6 x 1 | .. .. .. .. .. | 18 | 6 |
| „ „ | 4 x 1 | .. .. .. .. .. | 19 | 0 |
| Tallow-wood „ | 6 x 1 and 6 x 1¼ | .. .. .. | 20 | 6 |
| „ „ | 4 x 1 and 4 x 1¼ | .. .. .. | 21 | 6 |
| Beech „ | 4 x 1 and 4 x 1¼ | .. .. .. | 34 | 0 |
| „ „ | 6 x 1 and 6 x 1¼ | .. .. .. | 32 | 0 |
| Maryboro' Pine „ | 6 x 1 | .. .. .. .. .. | 23 | 0 |
| „ „ | 4 x 1 | .. .. .. .. .. | 24 | 0 |
| Hoop Pine „ | 4 x 1 | .. .. .. .. .. | 24 | 6 |
| Oregon „ | 6 x 1 | .. .. .. .. .. | 20 | 0 |
| Baltic „ | 6 x 1 | .. .. .. .. .. | 20 | 0 |
| „ „ | 4 x 1 | .. .. .. .. .. | 20 | 6 |
| Kauri „ | 4 x 1 | .. .. .. .. .. | 28 | 0 |
| „ „ | 6 x 1 | .. .. .. .. .. | 27 | 0 |
| Jarrah „ | 4 x 1 | .. .. .. .. .. | 26 | 0 |
| White Pine (N.Z.), T. & G., | 6 x 1 | .. .. .. .. | 20 | 0 |
| „ „ „ | 4 x 1 | .. .. .. .. | 20 | 6 |
| Pitch Pine, T. & G., | 4 x 1¼ and 6 x 1¼ | .. .. .. | 30 | 0 |
| „ „ | 6 x 1 | .. .. .. .. | 30 | 0 |
| If selected lengths in flooring, 2s. per 100ft. extra. | | | | |
| Tallow-wood Flooring, Kiln dried, 4s. per 100ft. extra. | | | | |
| Yellow Pine. 1 to 2in. thick | .. .. | per 100ft. super | 34 | 0 |
| Melbourne price, 3½d. per s. foot. | | | | |

| LINING. Best Quality. | | | Per 100ft. super. 1st | |
|---|---|---|---|---|
| | | | s. | d. |
| Maryboro' Pine, T. & G., | 4 x ½, Bd. or V Joint | .. .. | 16 | 0 |
| „ „ | 6 x ½ „ | .. .. | 15 | 0 |
| „ „ | 4 x ¾ „ | .. .. | 19 | 0 |
| „ „ | 6 x ¾ „ | .. .. | 18 | 6 |
| Kauri „ | 4 x ½ „ | .. .. | 18 | 6 |
| „ „ | 6 x ½ „ | .. .. | 17 | 6 |
| „ „ | 4 x ¾ „ | .. .. | 23 | 3 |
| „ „ | 6 x ¾ „ | .. .. | 22 | 9 |
| White Pine „ | 4 & 6 x ⅜ „ | .. .. | 12 | 0 |
| „ „ | 4 x ½ „ | .. .. | 14 | 0 |
| „ „ | 4 x ¾ „ | .. .. | 17 | 0 |
| „ „ | 6 x ¾ „ | .. .. | 17 | 0 |
| Baltic „ | 6 x ⅜ „ | .. .. | 11 | 6 |
| „ „ | 6 x ½ „ | .. .. | 13 | 6 |
| „ „ | 6 x ⅝ „ | .. .. | 15 | 0 |
| „ „ | 6 x ¾ „ | .. .. | 17 | 6 |
| „ „ | 4 x ½, V Joint | .. .. .. | 14 | 0 |
| Selected lengths, 1s. per 100ft. extra. | | | | |

## PARTITION LININGS.

| | Per 100ft. super. s. d. |
|---|---|
| Baltic, T. & G., Bead or V Joint on both sides, 6 x 1 .. | 22 0 |
| Oregon „ „ „ 6 x 1 .. | 22 0 |
| White Pine, T. & G. „ „ 6 x 1 .. | 22 0 |
| Kauri „ „ second quality „ 6 x 1 .. | 27 0 |

## WEATHERBOARDS.

Best Quality. Per 100ft. super.

| | 1st s. d. |
|---|---|
| Hardwood, Rough Splayed, 7in. .. .. .. .. | 13 6 |
| „ Dressed 7in. .. .. .. .. | 15 6 |
| Mahogany or Tallow-wood, Rustic dressed .. .. .. | 19 6 |
| Redwood, Rustic dressed .. .. .. .. .. | 24 6 |
| Oregon „ „ .. .. .. .. .. | 20 0 |
| Kauri „ „ .. .. .. .. .. | 27 0 |
| Maryboro' Pine, Rustic dressed .. .. .. .. .. | 23 6 |
| Baltic, C. & Ch. .. .. .. .. .. .. .. | 14 0 |

## DOOR JAMB LININGS.

Per Set.

| | Pine. | Cedar. |
|---|---|---|
| 5¾ x 1½ Single Rebates .. .. nett prices | 5/- | 11/- |
| „ „ „ with transoms .. .. .. | 8/- | 17/- |
| 10½ x 1½ Double Rebates .. .. .. .. | 8/- | 18/- |
| „ „ „ with transoms .. .. .. | 12/- | 26/- |
| 15 x 1½ .. .. .. .. .. .. | 13/- | 32/- |
| „ Double Rebates, with transoms .. .. | 16/6 | 42/- |

Jamb, centre beaded, per set extra 1/6.

## DOOR FRAMES.

| | s d | With loose stops. s d |
|---|---|---|
| 5 x 3 Hardwood Door Frames, solid rebated .. | 10 0 | 9 0 |
| 5 x 3 „ „ „ with transom .. | 14 0 | 13 0 |
| 5 x 3 „ „ „ „ and sill.. | 17 0 | 15 6 |
| 5 x 3 „ „ „ for circular fanlight | 20 0 | — |
| 5 x 3 „ „ „ for side and fanlight | 28 0 | — |

## CASEMENT FRAMES.

| | | |
|---|---|---|
| 5 x 3, with transom and sill .. .. .. .. | 17 0 | 15 6 |
| 5 x 3, with mullions, transom and sill, for opening, 8ft. 8in. x 5ft.; square head .. .. | 30 0 | — |

## VENETIAN SHUTTERS—(Minimum 14ft.).

| | Pine. | Cedar. |
|---|---|---|
| 1½ thick per foot, surface .. .. .. .. | 1/4¼ | 1/6½ |
| 1¾ „ „ „ .. .. .. .. .. | 1/6½ | 1/7½ |
| 1½ Hanging Styles, per set .. .. .. .. | | 2/1 |
| 1¾ „ „ „ .. .. .. .. .. | | 2/7 |

## VENETIAN BLINDS—(Minimum 14ft.).

Best Quality, Patent Check Action and Ladder Tapes, per foot .. .. .. .. .. .. 7d

Extract from printed Timber Merchants' Monthly Price List, October, 1907.

The prices fluctuate very little, but for large quantities a quotation is advisable.

## BAND MOULDINGS.

| | | Redwood. | Cedar. |
|---|---|---|---|
| 2½in. .. .. .. .. .. | per 100ft. lineal | 5/9 | 2¼d |
| 3in. .. .. .. .. .. | „ | 6/9 | 2½d |

## ARCHITRAVES.

| | | |
|---|---|---|
| 4 x 1 .. .. .. .. .. .. .. | 9/- | 3½d |
| 5 x 1¼ .. .. .. .. .. .. .. | 12/6 | 5d |
| 6 x 1¼ .. .. .. .. .. .. .. | 14/6 | 5½d |
| 6 x 1½ .. .. .. .. .. .. .. | 19/3 | 6d |
| 7 x 1½ .. .. .. .. .. .. .. | 22/- | 7½d |
| 8 x 2 .. .. .. .. .. .. .. | | 10½d |

## SKIRTINGS.

| | | |
|---|---|---|
| 6in .. .. .. .. .. .. .. | 12/6 | 5¼d |
| 7in. .. .. .. .. .. .. .. | 14/3 | 4½d |
| 8in. .. .. .. .. .. .. .. | 17/3 | 5½d |
| 9in. .. .. .. .. .. .. .. | 19/3 | 6½d |
| 10in. .. .. .. .. .. .. .. | 21/- | 7d |
| 12in. .. .. .. .. .. .. .. | 24/6 | 8¼d |
| 12in. x 1¼in. .. .. .. .. .. .. | 4d | 11d |
| 15in. x 1¼in. .. .. .. .. .. .. | 4½d | 1/4 |

## CORNICE.

| | | |
|---|---|---|
| 3 x 1 .. .. .. .. .. .. .. | 8/3 | 2¾d |
| 4 x 1 .. .. .. .. .. .. .. | 10/6 | 3¾d |
| 5 x 1 .. .. .. .. .. .. .. | 13/- | 5½d |
| 6 x 1 .. .. .. .. .. .. .. | 14/6 | 6d |
| 7 x 1¼ .. .. .. .. .. .. .. | 21/- | 7½d |
| 8 x 1¼ .. .. .. .. .. .. .. | 22/- | 8½d |

## SCOTIAS.

| | | |
|---|---|---|
| 1in. .. .. .. .. .. .. .. | 4/3 | 7/6 |
| 1¼in. .. .. .. .. .. .. .. | 5/3 | 9/6 |
| 1½in. .. .. .. .. .. .. .. | 6/3 | 15/- |
| 2in. .. .. .. .. .. .. .. | 9/3 | 3½d |
| 2½in. .. .. .. .. .. .. .. | 15/3 | 5½d |
| 3in. .. .. .. .. .. .. .. | 17/3 | 6d |

## PICTURE MOULDINGS.

| | Redwood. | Cedar. |
|---|---|---|
| 2 x 1 | 6/3 | 1¾d |
| 2½ x 1 | 8/3 | 2¼d |
| 3 x 1¼ | 11/6 | 3d |
| 4 x 1¼ | 14/6 | 4½d |

## SASH STOCK.

| | | |
|---|---|---|
| 2½ x 1½ Styles | per 100ft. lineal | 10/6 |
| 2½ x 1¾ „ | „ | 13/- |
| 4 x 1½ Bottom Rail | „ | 14/6 |
| 4 x 1¾ „ | „ | 16/6 |
| 2 x 1½ Meeting Bars | „ | 8/6 |
| 2¼ x 1¾ „ | „ | 10/6 |
| 1½ x 1 Bars | „ | 4/9 |
| 1¾ x 1 „ | „ | 6/3 |

## HAND RAILS.

| | Redwood. | Cedar. |
|---|---|---|
| 3½ x 2½ per foot lin. | 0 3 per ft. | 0 8 |
| 4 x 3 & 4½ x 3 per foot lin | 0 4 „ | 1 0 |
| 4¾ x 3¾ per foot lin. | 0 6 „ | 1 6 |

## WINDOW NOSING.

| | | |
|---|---|---|
| 2 x 1½ per 100ft. lineal | 7 3 | 16 0 |
| 2½ x 1½ per 100ft. lineal | 10 0 | 20 0 |
| 3 x 1½ per 100ft. lineal | 11 6 per ft. | 0 5 |

## BOLECTION MOULDING.

| | Redwood. | per ft. |
|---|---|---|
| 3 x 1½ per 100 ft. lineal | 13 0 | 0 3½ |
| 3¼ x 1½ „ | 17 0 | 0 4 |
| 2½ x 1¼ „ | 12 6 | 0 3½ |
| 2½ x 1¼ & 2¼ x 1¼ „ | 12 6 | 0 3¼ |
| 2¼ x 1¼ „ | 13 0 | 0 3½ |
| 2 x 1 „ | 9 3 | 0 2½ |
| 2 x ¾ „ | 8 3 | 0 1½ |

## WINDOW SILLS. Always in Stock.

| | | |
|---|---|---|
| 5 x 3 Hardwood, sunk and weathered | per 100ft. super | 19/6 |
| 6 x 3 „ „ | „ | 20/6 |
| 7 x 3 „ „ | „ | 21/6 |
| 8 x 3 „ „ | „ | 22/6 |
| 8 x 4 „ „ | „ | 24/6 |

## FACIA BOARDS (Beaded).

| | Oregon. | Redwood. |
|---|---|---|
| 6 x 1 | 10/6 | 12/6 |
| 8 x 1 | 14/9 | 16/3 |
| 10 x 1 | 18/6 | 20/- |
| 12 x 1 | 22/- | 24/- |

## BARGE BOARDS.

| | s. | d. |
|---|---|---|
| 12 x 1¼, Redwood, per foot | 1 | 3 |
| 12 x 1¼, „ „ | 1 | 6 |
| 12 x 1¼, „ „ | 1 | 3 |
| 16 x 1½, „ „ | 2 | 3 |

## TURNERY STOCK PATTERNS.

### BALUSTERS, TURNED.

| | | Pine. | Cedar. |
|---|---|---|---|
| 1½in. | Plain Stock | 4/6 | 6/- |
| 1¾in. | „ | 5/- | 7/- |
| 2in. | „ | 6/- | 8/- |

### NEWELS AND FINIALS.

| | | Pine. | Cedar. |
|---|---|---|---|
| 3in. x 3in. | 3ft. long | 1/6 | 3/6 |
| 3in. x 3in. | 4ft. „ | 1/9 | 4/- |
| 4in. x 4in. | 4ft. „ | 2/6 | 4/6 |
| 4in. x 4in. | 5ft. „ | 2/9 | 5/- |
| 4in. x 4in. | 6ft. „ | 3/- | 6/- |
| 4in. x 4in. | 7ft. „ | 4/- | 7/- |
| 4in. x 4in. | 8ft. „ | 4/3 | 7/9 |
| 4in. x 4in. | 9ft. „ | 4/6 | 8/6 |
| 5in. x 5in. | 5ft. „ | 4/- | 8/- |
| 5in. x 5in. | 6ft. „ | 4/6 | 9/- |
| 5in. x 5in. | 7ft. „ | 5/- | 10/6 |
| 5in. x 5in. | 8ft. „ | 6/- | 11/6 |
| 5in. x 5in. | 9ft. „ | 6/6 | 13/- |
| 6in. x 6in. | 5ft. „ | 5/9 | 11/6 |
| 6in. x 6in. | 6ft. „ | 6/6 | 13/- |
| 6in. x 6in. | 7ft. „ | 7/3 | 15/- |
| 6in. x 6in. | 8ft. „ | 8/6 | 17/- |
| 6in. x 6in. | 9ft. „ | 10/- | 20/- |
| Pillarettes, 6 x 1½ | | | 3/- |

### VERANDAH POSTS.

| | Hardwood. | Tallow-wood. | Beech. |
|---|---|---|---|
| 4 x 4 per foot run | 7d | 9d | 1/2 |
| 5 x 5 „ „ | 9d | 11d | 1/6 |
| 6 x 6 „ „ | 1/- | 1/2 | 2/- |

Tops for Post, H.W. or Pine, 4in. x 4in.—1/3. 6in. x 6in.—3/-

### TURNED HARDWOOD PICKETS.

| | |
|---|---|
| 4ft. 6in. Pointed or Gothic | per 100 count 18/- |
| 4ft. long, Acorn Tops | „ 18/- |
| 4ft. 6in. long, „ | „ 18/6 |
| 5ft. „ „ | „ 22/- |
| 4ft. „ Fancy Tops | „ 26/- |
| 4ft. 6in. „ „ | „ 29/- |

### DRESSED TRELLIS LATHS.

KAURI, per 100 feet, in special lengths.

| | | | |
|---|---|---|---|
| Size of lath | 1 x ¼ | 1¼ x ¼ | 1½ x ¼ |
| Per 100 feet run | 1/10 | 2/9 | 3/- |
| Size of lath | 1 x ⅜ | 1¼ x ⅜ | 1½ x ⅜ |
| Per 100 feet run | 2/9 | 3/- | 3/8 |

PUBLISHED PRICE LIST, OCTOBER, 1907.

These detail prices fluctuate very little, but for large quantities a quotation is advisable.

## DOORS.

### DOUBLE MOULDED, 4 PANELS.

| | Maryboro' Pine. | Amer. Pine. | Cedar. |
|---|---|---|---|
| 6ft. x 2ft. x 1¼in. .. .. .. | 11 0 | — | — |
| 6ft. 6in. x 2ft. 6in. x 1¼in. .. | 11 6 | 13 6 | 22 0 |
| 6ft. 6in. x 2ft. 6in. x 1½in. .. | 12 0 | 14 0 | 24 0 |
| 6ft. 8in. x 2ft. 8in. x 1¼in. .. | 12 6 | 14 0 | 27 0 |
| 6ft. 8in. x 2ft. 8in. x 1½in .. | 13 0 | 15 0 | 29 0 |
| 6ft. 8in. x 2ft. 8in. x 1¾in. .. | 14 6 | 17 9 | 33 0 |
| 6ft. 10in. x 2ft. 10in. x 1½in. .. | 14 0 | 17 9 | 35 0 |
| 6ft. 10in. x 2ft. 10in. x 1¾in. .. | 16 0 | 20 0 | 37 0 |
| 7ft. x 3ft. x 1½in. .. .. .. | 16 0 | 20 0 | 37 0 |
| 7ft. x 3ft. x 1¾in. .. .. .. | 17 0 | 20 6 | 41 0 |
| 7ft. x 3ft. x 2in. .. .. .. | — | — | 43 0 |

If fitted with Beads for Glass in top panels, Cedar same price. Pine 2s. 6d extra.

### 5 PANELS R.M., FOR GLASS.

| | Maryboro' Pine. | Amer. Pine. |
|---|---|---|
| 6ft. 8in. x 2ft. 8in. x 1½in. .. .. .. | 21 0 | 25 0 |
| 6ft. 8in. x 2ft. 8in. x 1¾in. .. .. .. | 21 6 | 25 6 |
| 6ft. 10in. x 2ft. 10in. x 1½in... .. .. | 21 6 | 25 6 |
| 6ft. 10in. x 2ft. 10in. x 1¾in. .. .. | 22 6 | 28 0 |
| 7ft. x 3ft. x 1¾in. .. .. .. .. .. | 24 6 | 28 6 |

### 4 PANELS BOLECTION MOULDINGS.

*(Or Prepared for Glass, Square Heads).

| | s d | s d |
|---|---|---|
| 6ft. 8in. x 2ft. 8in. x 1½in. .. .. .. | 19 0 | 21 6 |
| 6ft. 8in. x 2ft. 8in. x 1¾in. .. .. .. | 19 6 | 23 6 |
| 6ft. 10in. x 2ft. 10in. x 1½in. .. .. .. | 19 6 | 24 6 |
| 6ft. 10in. x 2ft. 10in. x 1¾in. .. .. .. | 20 6 | 25 6 |
| 7ft. x 3ft. x 1¾in. .. .. .. .. .. | 22 6 | 27 0 |

Bolection Moulding, Circular Head, extra, 2s. 6d.
Raised Panels, extra, 6s.

### 6 PANELS RAISED & BOLECTION MOULDINGS.

| | Pine. | Cedar. |
|---|---|---|
| 7ft. x 3ft. x 1¾in. .. .. .. .. | 41 6 | 58 0 |
| 7ft. x 3ft. x 1¾in. .. .. .. .. | 41 6 | 58 0 |

### MARGIN LIGHTS (GLAZED).

| | Marybor' Pine. | Amer. Pine. |
|---|---|---|
| 6ft. 6in. x 2ft. 6in. x 1½in. .. .. .. | 16 6 | 18 0 |
| 6ft. 8in. x 2ft. 8in. x 1½in. .. .. .. | 17 6 | 19 6 |
| 6ft. 8in. x 2ft. 8in. x 1¾in. .. .. .. | 20 0 | 22 0 |
| 6ft. 10in. x 2ft. 10in. x 1½in. .. .. .. | 19 6 | 21 6 |
| 6ft. 10in. x 2ft. 10in. x 1¾in... .. .. | 21 0 | 23 0 |
| 7ft. x 3ft. x 1¾ .. .. .. .. .. | 22 6 | 24 0 |

## LEDGE DOORS.

| | Pine. s | d |
|---|---|---|
| 6ft. 6in. x 2ft. 6in. x 1in. | 7 | 6 |
| 6ft. 8in. x 2ft. 8in. x 1in. | 8 | 0 |
| 6ft. 10in. x 2ft. 10in. x 1in. | 8 | 6 |
| 7ft. 0in. x 3ft. 0in. x 1in. | 9 | 0 |

## BEAD AND BUTT.

| | Pine. | Cedar. |
|---|---|---|
| 6ft. 8in. x 2ft. 8in. x 1½in. | 21 6 | 33 6 |
| 6ft. 6in. x 2ft. 6in. x 1½in. | 19 6 | 30 6 |
| 6ft. 8in. x 2ft. 8in. x 1¾in. | 23 6 | 36 6 |
| 6ft. 10in. x 2ft. 10in. x 1½in. | 23 6 | 36 6 |
| 6ft. 10in. x 2ft. 10in. x 1¾in. | 24 6 | 40 0 |
| 7ft. 0in. x 3ft. 0in. x 1¾in. | 26 6 | 43 0 |
| 7ft. 0in. x 3ft. 0in. x 2in. | 31 6 | 45 0 |

## BEAD AND FLUSH.

| | | |
|---|---|---|
| 6ft. 6in. x 2ft. 6in. x 1½in. | 20 6 | 35 0 |
| 6ft. 8in. x 2ft. 8in. x 1½in. | 22 6 | 37 0 |
| 6ft. 8in. x 2ft. 8in. x 1¾in. | 24 6 | 40 0 |
| 6ft. 10in. x 2ft. 10in. x 1½in. | 24 6 | 41 0 |
| 6ft. 10in. x 2ft. 10in. x 1¾in. | 25 6 | 43 0 |
| 7ft. 0in. x 3ft. 0in. x 1¾in. | 28 6 | 45 0 |
| 7ft. 0in. x 3ft. 0in. x 2in. | 31 6 | 46 0 |

## FRENCH CASEMENTS.

(Diminished Styles, Glazed).

| | Pine. |
|---|---|
| 7ft. x 3ft. x 1½in. Doubled Moulded | 19 6 |
| 7ft. x 3ft. x 1¾in. „ | 21 6 |
| 7ft. x 3ft. 4in. x 1½in. „ | 21 6 |
| 7ft. x 3ft. 4in. x 1¾in. „ | 22 6 |
| 7ft. x 3ft. x 1¾in. Bolection Moulding | 22 6 |
| 7ft. x 3ft. 4in. x 1¾in. „ | 24 6 |

## FRAMED LEDGE DOORS.

| | Pine. s | d | Cedar. s | d |
|---|---|---|---|---|
| 6ft. 8in. x 2ft. 8in. x 1¾in. | 18 | 6 | 35 | 0 |
| 6ft. 10in. x 2ft. 10in. x 1¾in. | 20 | 6 | 40 | 0 |
| 7ft. x 3ft. x 1¾in. | 22 | 6 | 43 | 0 |

## FANLIGHTS (PINE GLAZED).

| | | Thick. 1½ | Thick. 1¾ |
|---|---|---|---|
| 2ft. 8in. x 1ft. 2in. | each | 4 0 | 4 6 |
| 2ft. 10in. x 1ft 4in. | „ | 4 3 | 4 9 |
| 2ft. 10in. x 1ft. 6in. | „ | 4 6 | 5 6 |
| 3ft. 0in. x 1ft. 4in. | „ | 5 0 | 5 6 |
| 3ft. 0in. x 1ft. 6in. | „ | 5 3 | 5 9 |
| 3ft. 4in. x 1ft. 4in. | „ | 5 3 | 5 9 |
| 3ft. 4in. x 1ft. 6in. | „ | 5 6 | 6 0 |

## SINGLE SASHES (GLAZED).

| | | Size over all. | | |
|---|---|---|---|---|
| 10 x 8 | 4 lights | 2ft. 0¾in. x 1ft. 7¾in. | each | 3 6 |
| 10 x 12 | 4 „ | 2ft. 4¾in. x 1ft. 11¾in. | „ | 4 0 |
| 10 x 14 | 4 „ | 2ft. 8¾in. x 1ft. 11¾in. | „ | 4 6 |
| 12 x 14 | 4 „ | 2ft. 8¾in. x 2ft. 3¾in. | „ | 5 6 |
| 12 x 16 | 4 „ | 3ft. 0¾in. x 2ft. 3¾in. | „ | 6 0 |

## STOCK SIZE SASHES (GLAZED).

| Size. | per pair. | 2 lights. s d | 4 lights. s d | 12 lights. s d | Size over all. |
|---|---|---|---|---|---|
| 10 x 8 | „ | — | 5 6 | 5 6 | 3ft. 9½in. x 2ft. 4in. |
| 10 x 12 | „ | 8 6 | 6 9 | 6 6 | 4ft. 5¾in. x 2ft. 10in. |
| 10 x 14 | „ | 11 6 | 8 0 | 8 0 | 5ft. 1¾in. x 2ft. 10in. |
| 10 x 16 | „ | 14 0 | 11 6 | 11 0 | 5ft. 9¾in. x 2ft. 10in. |
| 12 x 14 | „ | 16 0 | 14 0 | 13 6 | 5ft. 1¾in. x 3ft. 4in. |
| 12 x 16 | „ | 18 0 | 17 0 | 17 0 | 5ft. 9¾in. x 3ft. 4in. |

| | | s. d. |
|---|---|---|
| If made of Cedar, 10 x 8 | per pair extra | 0 9 |
| „ „ 10 x 12, 10 x 14, 10 x 16 | „ „ | 1 0 |
| „ „ 12 x 14, 12 x 16 | „ „ | 2 0 |

## STOCK BOX FRAMES.

| | | | |
|---|---|---|---|
| 10 x 8 .. .. | each 8 0 | Daylight sizes, | 3ft. 11¾in. x 2ft. 4in. |
| 10 x 12 .. .. | „ 10 6 | „ | 4ft. 7¾in. x 2ft. 10in. |
| 10 x 14 .. .. | „ 12 0 | „ | 5ft. 3¾in. x 2ft. 10in. |
| 10 x 16 .. .. | „ 13 0 | „ | 5ft. 11¾in. x 2ft. 10in. |
| 12 x 14 .. .. | „ 14 6 | „ | 5ft. 3¾in. x 3ft. 4in. |
| 12 x 16 .. .. | „ 15 0 | „ | 5ft. 11¾in. x 3ft. 4in. |

Wide Sillls, 1s. 6d. extra.

DAYLIGHT SIZE OF BOX FRAMES means from under side of sill to under side of head of frame.

## VENETIAN SHUTTERS.

| | | Pine. | Cedar. |
|---|---|---|---|
| 1½ thick, for 10 x 12 Box Frames .. .. | | 16 0 | — |
| „ „ „ 10 x 14 „ .. .. | | 17 6 | — |
| 1¾ „ „ 12 x 14 „ .. .. | | 25 0 | — |
| „ „ „ 12 x 16 „ .. .. | | 27 0 | — |
| „ „ larger sizes, per foot super, from | | 1 2 | 1 8 |
| „ „ Circular Heads „ „ | | 2 0 | 2 6 |
| „ „ Segment Heads „ „ | | 1 9 | 2 3 |
| 1½ Bead and Butt Shutters „ „ | | 1 3 | 1 8 |
| 1¼ Bead and Flush „ „ | | 1 5 | 1 10 |
| 1½ Panel Shutters, one side moulded „ „ | | 1 0 | 1 6 |
| Hanging Styles, per set .. .. | | 2 6 | 3 6 |

# PLASTERER.

## MEASUREMENT.

In Measuring Plastering, a variety of opinions exist, all of them tending more or less to misunderstanding, and consequent litigation.

The least objectionable method is to take the *net measurement* at a price calculated to meet the cost of the work under consideration, including all extras.

Walls and ceilings by the super. yard.

Cornices and mouldings by the running foot, per inch girt.

Ordinary openings with 4½in. reveals are not deducted.

The price for 4½in. reveals in Portland cement is about 4d. per lin. foot. Taking a 6ft. x 3ft. window, the reveals will cost 5s., which is also the cost of 2 sup. yards of cement stucco.

The weathering of cornices to be taken as plain work.

**Panels,** mitres, returns, columns, caps and bases, balusters, dentil blocks, and patterns, &c., so much each, according to dimensions.

Narrow widths, dadoes, skirtings, &c., kept separate and reckoned by the lin. ft.

Rough cast, lined work, projecting quoins, basecourses, kept separate and reckoned accordingly.

Or priced extra on plain body work, according to the cost of extra labour.

If circular, add one-fourth, if circular circular, as in domes or concentric arches, add one-half to each item.

Scaffolding to be charged extra, if erected expressly for the work.

In taking the height of walls for inside plastering, measure down to *skirting grounds.*

If no grounds, then down to the floor, deducting all openings except for "labour only."

If more than 4 mitres in one room they are allowed for in measuring cornices.

## MEMORANDA.

**Cement.**—In using cement for fine joints of brick, or ashlar, it cannot be too pure; but for plaster, best fresh Portland cement will take from 3 to 5 times its bulk of sand, if painted.

*The relative value of cements* is in proportion to their tensile strength. Taking 3 samples of cement whose tensile strength is equal to 300, 450, and 600lbs per square inch respectively. If the first would require one-third cement, the second would be equally strong with one-fourth, and the third with one-fifth cement.

**Portland Cement Stucco** should be rendered and set or *roughed* in and finished in two coats, the second, or setting coat, can be added before the first coat dries, otherwise it must be scored with a pointed lath or nail rake. In every case the walls should be watered before the stucco is applied or its stability cannot be guaranteed; it is also necessary, if the cement is to become hard throughout, or properly set, that it be saturated with water daily, from 3 to 14 days, according to the heat of the

weather, until there is no more suction, otherwise the cement stucco or plaster will merely have a hard surface, while the bulk remains a dry powder. Really good cements are often badly treated.

**Porosity.**—All exposed flat surfaces, or weatherings, should be set in pure cement, the addition of sand makes it porous in proportion to the quantity used."

**Metal or steel Lathing** is made by cutting a steel plate and expanding the *strand* into an oblong mesh about 1in. x ⅜in., and resembles a narrow steel tape twisted to an angle of about 60 degrees with the face of the plate (or joists when fixed) giving increased strength with a *perfect and uniform key to retain the mortar*, which never cracks or gives way. It is sold in sheets (6ft. and 7ft. 6in. x 2 wide). It is easily nailed to studs or ceiling joists, and is generally superior to the usual wooden laths, which sometimes give way and loosen the plastering. It is easily curved or bent for all kinds of twisted surfaces, covered ceilings, soffits of stairs, and cornices, and is *very durable* and perfectly *fire proof*.

Where space and weight are a consideration, thin, light, and solid partitions on expanded Steel Lathing No. 1, 3/8-in. mesh, 24 B.W.G., can be used, interlaced on and fastened to ¼in. or 3/8-in. W.I. vertical rods, spaced about 1 foot apart, tautly fixed and hooked into eye bolts screwed into ceiling and floor joists ; plastered on both sides with a finished thickness of 2in., forms a very light, yet exceedingly strong, rigid, and practically fire and vermin proof wall, the combined steel and plaster work forming a monolithic slab able to withstand any reasonable pressure or thrust, in partitions from 14ft. to 16ft. high. In hollow partitions, the lathing may be similarly used on wood studs or angle steel, using two layers of the lathing, and plastered on the outside only.

For arches, encasing C.I. columns, H steel stanchions, girders, etc.

Price is 1s. 6d. per super. yard.

**Fixing.**—6d. extra to ceilings, per super. yard.

Fixing to partitions and rods, 9d. to 1s. per super. yard.

[N.B.—Nos. 64 and 39 (smaller gauge) are used for ripples in gold-saving and concentration tables.]

## CURRENT CONTRACT PRICES.

| Materials, Labour and Profit. | per sup. yard. |
|---|---|
| Render, float and set .. .. .. .. .. | .. 1 6 |
| ,, ,, ,, with laths (wood) .. .. .. | .. 2 2½ |
| ,, ,, ,, with Metal lathing .. .. .. | .. 3 8 |
| Cement Rendering, ½″ thick steel trowelled .. .. | .. 1 8 |
| ¾″ ,, .. .. .. | .. 2 3½ |
| 1″ ,, .. .. .. .. | .. 2 9 |
| Extra if finished in Keene's Cement .. .. .. | .. 1 1 |
| | per ft. run. |
| Mouldings and Cornices, 1″ Plaster, per inch girt .. | .. 0 1¼ |
| ,, Cement do. .. .. | .. 0 1¾ |
| ,, Keene's Cement do... .. | .. 0 2¼ |

## PLASTERERS' MATERIALS.

| *Subject to Fluctuation.* | Sydney. s. | d. |
|---|---|---|
| Portland Cement, best brands, per cask | 11 | 0 |
| Ditto, Rock or Union brand, per bag, 125lbs., each | 4 | 0 |
| or 3 bags = one cask. 374lbs., net | 10 | 0 |
| Rock wall plaster, per cask | 16 | 6 |
| Asbestic plaster cement, per bag, 100lbs. | 5 | 6 |
| Keen's Cement, per cask | 33 | 0 |
| Stone Lime, per bag, 3 bushels | 4 | 6 |
| Shell Lime, per bag, 3 bushels | 4 | 0 |
| Plaster of Paris, per cask, 3½ bushels | 16 | 0 |
| Sawn Oregon Laths, 4ft. 6in. x 1¼in., per 100 bundle | 3 | 0 |
| Expanded Diamond Metal Lathing, per super yard | 1 | 6 |
| " Memel " Steel Lathing, in sheets, 6 x 1ft. 6in. per super. yd. (requiring 1lb. nails to every 9 yards.) | 1 | 1 |
| Yellow Sydney Sand, per load, 23 cubic ft. | 4 | 0 |
| White Sydney Sand, per load, 23 cubic ft. | 3 | 6 |
| Nepean River Coarse Sand, at railway, per ton | 5 | 6 |
| Hair, long cows', per bushel | 1 | 6 |

2 bundles of 4ft. 6in. x 1¼in. Oregon Laths will cover 100 sq. ft., or 11 sq. yards.

| | | |
|---|---|---|
| No. 1 Expanded " Diamond " Lathing, ⅜" mesh x 24 G., in sheets 6′ 0″ x 2′ 0″ and 7′ 6″ x 2′ 0″, per super yard | 1 | 6 |
| No. 84 Expanded " Cup " Lathing, ⅜" mesh x 24 G., in sheets, 7′ 8″ x 1′ 8″, per super. yard | 1 | 4 |
| No. 82 Expanded " Cup " Lathing, ⅜" mesh x 27 G., in sheets, 7′ 8″ x 1′8″, per super. yard | 1 | 2 |

### Covering Power of Plaster.

Stone Lime, 1 cubic yard.
Sand, 3 cubic yards.
Hair, 2 bushels.

| The above— | ½-in. Thick. On brick. s. yds. | On laths. s. yds. |
|---|---|---|
| Will render and set, *i.e.*, 2-coat work | 75 | 70 |
| Will render, float, and set 3-coat work | 65 | 60 |

Mem.—9 bushels of lime, 1 cubic yard of clean sharp sand, and 6 pecks of loose cow hair (free from salt) will suffice for the following finished work, 1 inch thick :—

37 sup. yards render or rough stucco and set.
35 sup. yards lay or rough stucco on lath and set.
32 sup. yards, render 2 coats and set or float, or
30 sup. yards, lay 2 coats, and set or float.

## WALLS AND CEILINGS.

### Rendering, Lathing, &c.

| *Per yard super.* | Materials. s. | d. | Labour. s. | d. |
|---|---|---|---|---|
| Render or plaster rough on walls .. .. .. | 0 | 5 | 0 | 4 |
| Ditto and set with fine stuff, 2 coats .. .. | 0 | 7 | 0 | 6 |
| Ditto, float, and set with tinted fine stuff (3 coats trow'ld) | 0 | 9 | 0 | 8 |
| Lathing only, Oregon laths to partitions .. .. | 0 | 3 | 0 | 3 |
| ,, and plaster, or lay one coat, do. .. .. | 0 | 7 | 0 | 7 |
| ,, lay and set two coats do. .. .. | 0 | 10 | 0 | 10 |
| ,, Expanded Patent steel lathing partitions, floated | 2 | 3 | 0 | 10 |
| Expanded steel laths, lay, float and set to ceilings | 2 | 3 | 0 | 11 |
| If set with gauged putty, add .. .. .. | 0 | 2 | 0 | 1 |
| ,, with plaster of Paris, add .. .. .. | 0 | 4 | 0 | 2 |
| Lath, lay, float, and set to jambs, friezes, or soffits, per super ft. .. .. .. .. .. | 0 | 2 | 0 | 3 |
| Render, float, and set to ditto do. .. .. | 0 | 1 | 0 | 2 |

The tints used for the setting coats are generally French gray, drab or salmon ; other tints are charged for extra, chrome yellows are always clouded.

The quirks next wooden beads are included in the prices.

The mortar is reckoned at one-third stone lime and two-thirds clean sand, mixed with long ox hair—thickness, $\frac{3}{4}$ inch.

In consequence of the suction from the dry bricks, brick walls in Australia are generally rendered in one coat only, and the plaster does not harden but leaves a dry powder under the hard trowelled skin. If the walls were watered the plaster would be much harder, and this hardness could be indefinitely increased by daily watering the plaster for a week at least, especially during hot weather. This might be objected to in winter, when buildings are already delayed by the plaster drying too slowly. In Great Britain, France, &c., this difficulty is overcome by stove drying the best buildings.

### Stucco or External Plastering.

| *Per super yard.* | Materials. s. | d. | Labour. s. | d. |
|---|---|---|---|---|
| Bastard, or rough stone or hydraulic lime stucco, jointed on brick or stone walls .. .. .. | 0 | 8 | 0 | 10 |
| Ditto, on lath, including lathing .. .. .. | 1 | 0 | 1 | 0 |
| Trowelled stucco, on brick or stone .. .. .. | 0 | 8 | 1 | 1 |
| Ditto, on lath and lathing .. .. .. .. | 1 | 0 | 1 | 3 |
| Raised margins to form panels, 4 inches wide moulded, per foot run .. .. .. .. | 0 | 2 | 0 | 4 |
| $4\frac{1}{2}$ inch reveals to windows do. .. .. | 0 | 1 | 0 | 2 |
| 9 inch ditto do. .. .. | 0 | 2 | 0 | 3 |

The above materials include stone or hydraulic lime, which is best adapted for stucco or external plastering.

## Cornices, &c., in Plaster of Paris.

*Including lathing (if bracketted) or dubbing out.*

| *Per foot run* | Materials. s. | d. | Labour. s. | d. |
|---|---|---|---|---|
| Plain impost or other mouldings 4 in. girt | 0 | 2 | 0 | 3 |
| Ditto, from 4 to 8 inches girt .. .. | 0 | 3 | 0 | 4 |
| Ditto, from 8 to 12 inches girt.. .. | 0 | 4 | 0 | 6 |
| Cornices, with soffit and frieze, the whole girt to be taken at per foot super .. | 0 | 6 | 0 | 6 |

Enrichments, centre flowers, &c., see Index.

## Portland Cement Stucco.

| *Per yard super.* | Materials. s. | d. | Labour s. | d. |
|---|---|---|---|---|
| Rough render, in cement .. .. | 1 | 0 | 0 | 9 |
| Plain face, on brick or stone, jointed .. | 1 | 4 | 1 | 0 |
| Ditto on lath including lathing.. .. | 1 | 9 | 1 | 3 |
| Cornices as before per foot super .. | 0 | 4 | 0 | 8 |
| Large skirtings, per sup. foot .. .. | 0 | 4 | 0 | 6 |
| Plain facia, frieze or pilasters, do. .. | 0 | 4 | 0 | 6 |
| Astragals, ovolos, O G.'s, and other mouldings, grooves, or sinkings, under 4 inches girt, per foot run .. .. | 0 | 1 | 0 | 3 |
| Ditto, from 4 to 8 inches, do. .. .. | 0 | 2 | 0 | 4 |
| Ditto, from 8 to 12 inches girt, do .. | 0 | 3 | 0 | 5 |
| 4½ inch reveals or margins, per foot run. | 0 | 2 | 0 | 2 |
| 9 inch do. do. do .. | 0 | 3 | 0 | 3 |

N.B.—The above prices for materials are reckoned at 5s per bushel for Portland cement, and 6d. per bushel for clean-washed sand, mixed in the proportion of 1 of cement to 3 of sand, and averaging ¾ inch thick.

If 1 of cement and 2 of sand is required, add one-fourth to the price of the materials

**Mitres and stops** in Plaster or Cement, cornices, reckon 1 ft. extra.

### MATERIAL REQUIRED

*for ¾ in. thickness of Compo.*

**Portland Cement or Keene's Cement Plastering**—

1 bushel cement and 1 bushel sand will cover 3 sup. yards.
1 do. cement and 1½ bushels of sand will cover 3¾ sup. yards.
1 do. cement and 2 of sand, 4½ sup. yards.
1 do. cement and 3 of sand, 6 sup. yards.
1 do. cement and 4 of sand, 7½ sup. yards.

N.B.—By adding ½ to the number of sup. yards, the area at ½ inch thick, or deducting one-third, the area at 1 inch may be obtained.

## KEENE'S CEMENT.

| *Dubbed out with cement compo.* | Materials. | Labour. |
|---|---|---|
| *Per yard super.* | s. d. | s. d. |
| Superfine cement trowelled on brick or stone .. | 2 6 | 1 3 |
| Ditto, on lath, including lathing .. .. .. | 3 0 | 1 6 |
| Panels moulded (small) .. .. .. .. | 0 7 | 0 9 |
| *Per foot super.* | | |
| Facias, jambs, pilasters, architraves .. .. | 0 5 | 0 7 |
| Plain mouldings, medium cement .. .. .. | 0 9 | 0 11 |
| Ditto, skirtings, 9 to 18 inches high, with 3 inches moulded, or sunk and moulded .. .. .. | 0 9 | 0 9 |
| Superfine cement, plain faced and polished .. .. | 0 9 | 1 0 |
| Superfine cement plain mouldings .. .. .. | 1 0 | 1 0 |
| Superfine cement polished buff .. .. .. | 1 1 | 1 2 |
| Ditto. do. green or blue .. .. | 1 6 | 1 3 |

If circular, as in columns, groins, &c., add one-fourth.

The above items are reckoned to contain one-third Keene's cement to two-thirds clean, sharp sand, and plain work to average $\frac{3}{4}$ in., thick.

## LIME WHITE, WHITEWASHING, &c.

| *Per super yard.* | Labour. |
|---|---|
| Lime white, per coat (lime and water) .. .. | 0 1½ |
| Ditto, two coats do. .. .. .. | 0 3 |
| Wash, stop, and white-washing with whiting and size to old work | 0 4 |
| Ditto, to old ceilings .. .. .. .. .. .. | 0 5 |
| Plain cornice washed, stopped and whited, per foot super, with whiting and size .. .. .. .. .. .. | 0 1½ |

Half a bushel of quick lime is required for 70 super yards of lime-white, one coat. 12lbs. whiting, ½lb. blue black, and 7 qts. size will do the same quantity of white-wash, equal to 40 s. yds. per gal.

Cement stucco or plaster is too often coloured with lime white, mixed with about one-fifteenth the quantity of oil (generally raw linseed oil, although black oil or common tallow will do), while hot from the slaking of the stone lime. One gallon will cover from 35 to 40 sup. yards one coat, or about 28 sup. yards two coats. Although nearly waterproof, it will seldom withstand continuous driving rain on exposed walls.

## PORTLAND CEMENT CASTINGS.

| | Fixed. |
|---|---|
| | s. d. |
| Chimney pots, 27 to 30in. high .. .. .. | 5s. to 10 0 |
| Ditto 31 to 36in. high .. .. .. | 8s. to 15 0 |
| Terminals, 2 ft. and under, 4s. per ft., 2 to 3 feet .. .. .. | 5 0 |
| Ditto, 3 ft. to 4ft. high, per foot .. .. .. .. .. | 7 0 |
| Balusters up to 24in. high, per inch in height .. .. .. | 0 3 |
| Ditto over 24 in. high, per extra inch .. .. .. .. | 0 5 |
| Brackets or trusses, 3 in. projection, each .. .. .. .. | 3 0 |
| Ditto 4 do. .. .. .. .. | 4 0 |
| Ditto 5 do. .. .. .. .. | 5 0 |
| Bosses and window sill blocks from .. .. .. .. .. | 0 8 |

N.B.—These prices for items fixed are for places easily accessible, and where all the plaster trades are taken together.

## MODELLER, &c.

| *Items each.* | Modelling in clay. s. | Plaster Castings fixed. s. | d. |
|---|---|---|---|
| Ionic capital, for 12 inch column .. | 80 | 32 | 0 |
| Ditto 18 do .. .. | 120 | 40 | 0 |
| Ditto 24 do .. .. | 160 | 60 | 0 |
| Corinthian or Composite capital, for 12 inch column .. .. .. | 100 | 40 | 0 |
| Ditto 18 inch column .. .. | 140 | 60 | 0 |
| Ditto 24 do. .. .. | 200 | 80 | 0 |
| Pilasters the same as capitals, quarter pilasters, one half. | | | |
| Modillion enriched, 4 inch projection .. | 20 | 1 | 6 |
| Ditto 6 inch do. .. | 24 | 2 | 3 |
| Ditto 8 inch do. .. | 32 | 3 | 0 |
| Trusses enriched, 10 in. × 5 in... .. | 24 | 5 | 0 |
| Ditto 12 in × 6 in. .. .. | 28 | 6 | 0 |
| Ditto 18 in. × 9 in. .. .. | 40 | 9 | 0 |
| Pateræ or rosette, 4 in diam. .. .. | 8 | 1 | 0 |
| Ditto 8 in. do. .. .. | 12 | 3 | 0 |
| Centre or ceiling flower, 12 in. diam. .. | 24 | 2 | 6 |
| Ditto 18 do. .. | 32 | 4 | 0 |
| Head on keystone, 12 inches deep .. | 18 | 10 | 0 |
| Ditto 15 inches ,, .. | 20 | 14 | 0 |
| Ditto 18 inches ,, .. | 24 | 18 | 0 |
| Acanthus, or lotus leaf, 8 inches high .. | 12 | 2 | 0 |
| Ditto 12 inches do. .. | 18 | 4 | 0 |
| Oak or laurel wreath, 9 inches diam.. . | 20 | 3 | 0 |
| Ditto 12 inches do. .. | 28 | 4 | 0 |
| Ditto 18 inches do. .. | 36 | 6 | 0 |
| *Per foot run.* | | | |
| Egg and dart moulding, 2 inch girt .. | 10 | 0 | 6 |
| Ditto do. 4 inch do. .. | 12 | 0 | 8 |
| Ditto do. 6 inch do. .. | 14 | 0 | 10 |
| Rope or cable do. 2 inch do. .. | 10 | 0 | 6 |
| Ditto, round spiral column .. | 12 | 1 | 3 |

**Casting ceiling flowers** from 2 ft. to 5 ft. diam. will cost about 2s. per sup. foot, as ascertained by squaring the diam. (2 feet diam. = 4 sup. ft. and 3 ft. diam. = 9 sup. ft. &c.) All ceiling flowers should be perforated for ventilation.

## PATENT PAVINGS.

The prices include Plaster and fixing, and the use of moulds in stock, but from 2 to 25 pieces (according to value), or 50 feet of moulding are presumed to be required at these prices.

The prices of cement castings fixed would be about three-fourths these prices.

### PATENT PAVINGS.

### ARKILITE.

**Steps and Nosings laid in position.**

**Arkilite Tiles,** 8″ x 8″ x ⅞″, all colours, per s. yd., from .. 5 0
**Arkilite 1in. Flooring,** grey, 4/6 ; red .. .. .. .. 5 6
Ditto, 2in. Nosings, steps, per foot run, from .. .. .. 1 5
Ditto, Closet Floors, from 10/6 ; copper tops .. .. .. 7 6

**Aegypto Polished Paving,** all colours, for internal floors, &c.

For the above *see* full particulars and prices, page 4 advertisements.

### IRONITE.

### PAVING AND FLOORING.

| For 25 yards and over. | Grey. | Slate. | Red. |
|---|---|---|---|
| | s. d. | s. d. | s. d. |
| 1-inch thick, per yard .. .. .. | 4 6 | 4 9 | 5 6 |
| 3 ,, ,, ,, .. .. .. .. | 6 6 | 7 0 | 7 6 |
| 4 ,, ,, ,, .. .. .. .. | 7 0 | 7 6 | 8 0 |
| 5 ,, ,, ,, .. .. .. .. | 7 9 | 8 3 | 8 9 |
| 6 ,, ,, ,, .. .. .. .. | 8 6 | 9 0 | 9 6 |

**Solid Steps, Riser and Tread combined.**

All sizes up to 12″ x 8″ per foot run.

**Steps,** plain colours .. .. .. .. .. .. 2 10
Ditto do. 4 tiles embedded in riser .. .. .. .. 3 2
Ditto do. 9 tiles embedded in riser .. .. .. .. 3 6
Space left for inserting 1″ riser .. .. .. .. .. 2 7
With blue tread, riser not nosed .. .. .. .. .. 2 4

Returns 6d. extra. Cartage over three miles and setting, extra.

**Steps** and **Nosings,** 2 in. thick, for 20 ft. and over, **laid** in position—
12 inches wide and under, per ft. run, slate color, 1/8 ; red 1 9
Full returns, 6d. ; short returns, 2d. extra.

**Coping,** design not fixed—
12 x 12 from 4/6 per run ft. 9 x 9 from 2/10 per ft. run.
12 x 9 ,, 3/6 ,, 9 x 6 ,, 2/3 ,,
12 x 6 ,, 2/10 ,, 9 x 3 ,, 1/7 ,,
Returns from 9d. each extra.

If other work is done on job, the following prices are charged :—
**Closet Floors,** Nosed Step, each, from .. .. .. .. 10 6
**Hearths** laid, grey, red, or slate color, each, from .. 6 0
**Copper Tops,** 2-ins. thick on outer edge, each, from .. 7 6

For further information, *see* advertisement, page 28.

## FIBROUS PLASTER.

### FIBROUS PLASTER CEILINGS AND CORNICES.

The demand for this class of work has increased to a wonderful extent of late years.

Its peculiar adaptability for all classes of building, the beauty and variety of designs ; its wonderful fire-resisting qualities, and the facility with which it can be forwarded to any part of the Commonwealth, have brought it very much into prominence.

It is advisable to get quotations for the work " fixed complete," as the staff of workmen who are constantly employed in fixing these ceilings naturally give better results than those who have but a scanty acquaintance with tehm. In this connection Messrs. Grant & Cocks, of Sydney, are specialists for this class of work, and are always prepared to quote and submit designs for interior or exterior decorative work, also forward to any part of Australia. (*See* advertisement, page 22.)

**Plasterer's Scrim,** which is supplied in rolls, 1 yard wide, about 216 yards long, is now largely used by plasterers in ceiling work, and in stud partitions. It possesses great value in strengthening the plaster to minimise cracking.

It is applied immediately after the pricking coat, and is worked in by the trowel before same is set. The floating and setting coats are afterwards applied in the usual way. Price of Scrim, 2d. per yard.

Wire netting of small mesh is used in a similar manner, and tends greatly to strengthen the work.

| *Subject to Trade Discounts.* | | | Fixed. | |
|---|---|---|---|---|
| **Partition Wall Blocks,** 2½ inches thick, per yd. .. | 5 | 6 | | |
| Ditto do. do. fixed and finished both sides yd. | | | 7 | 6 |
| Ditto, 4½in. thick, per yard .. .. .. .. | 8 | 6 | | |
| Ditto, do. fixed and finished both sides, yd. | | | 10 | 6 |
| **Ceiling, Plain Panels,** per yard, from .. .. | 2 | 6 | 5 | 0 |
| **Plain Panels,** with cover mouldings, from per yd. .. | 2 | 9 | | |
| Ditto, fixed with gal. clouts on 3 x ½ battens, finished | | | 5 | 0 |
| **Ornamental Panels,** f.o.b. Sydney, per yard, from .. | 3 | 0 | | |
| | per foot run. | | Fixed. | |
| **Cornices,** 2½in. from .. .. .. .. | 0 | 2 | | |
| 4 x 3¼ .. .. .. .. .. | 0 | 6 | 0 | 8 |
| 7½ x 6 .. .. .. .. .. | 1 | 0 | 1 | 3 |
| 8 x 6 .. .. .. .. .. | 1 | 3 | 1 | 6 |
| 9 x 8 .. .. .. .. .. | 1 | 3 | 1 | 6 |
| 6 x 11 .. .. .. .. .. | 1 | 6 | 2 | 0 |
| 10 x 10 .. .. .. .. .. | 2 | 0 | 2 | 6 |
| 5 x 5½ .. .. .. .. .. | 0 | 9 | 1 | 0 |
| 9 x 11 .. .. .. .. .. | 2 | 0 | 2 | 6 |
| **Friezes,** 18″ deep, Ornamental .. .. .. | 1 | 3 | 1 | 9 |
| 20″ do. .. .. .. .. | 1 | 10 | 2 | 3 |
| **Arches, Imposts, Columns** and **Capitals,** solid. According to design. | | | | |
| **Wall Vents,** 6 x 9, from, each .. .. .. .. .. | | | 0 | 6 |
| **Ceiling Centre Flowers,** 32in. diameter, each, from .. .. | | | 12 | 0 |

**Capitals** and **Columns** covering.
**Over doors, Over Arches,** and **Over mantels,** each, from .. 25 0
**Corbels,** cantilever brackets, from .. .. .. .. 2 6
**Soffits of Beams** and **Girders Casing**—
Fixed, per foot super .. .. .. .. .. .. 1 6
Firring not included.
**Soffits** of stairs and Spandrils, fixed, per yard, from .. .. 5 0

**Victorite,** a new plastering material made by Cafferata & Co., Newark-on-Trent, to be mixed with lime putty and washed sand, forming a cement surface of exceptional hardness and strength. Unlike Keene's cement, there is no waste, as droppings and remnants can be retempered and used without detriment. Large gaugings can be made for several hours' use, and can be trowelled to a marble-like surface. Water floating. In two kinds or shades.

Plain plastering on walls, use No. 2 Victorite, 1 part ; slacked lime putty, 1 part ; sand, 4 parts. Finish with No. 2 Victorite neat, for buff, or No. 1 Victorite for white finish.

For laths, use 1, 1, and 3 proportion, with plenty good hair.

One ton of Victorite is sufficient for 340 sq. yards of ½in. thick.
Material and labour, walls, per sq. yard .. .. .. 2 3
Ditto. do. ceilings, per sq. yard .. .. .. 2 9

For further particulars apply to sole agent for N.S.W., G. T. Cross, Bridge-street, Sydney.

## MARBILITE.

**Marbilite.**—A quick-drying and very hard plaster, made from gypsum and other ingredients, said not to crack or blister, and costs less than Keene's or Parian Cement. Made in three grades. Particulars from agents, *see* page 6 advertisements.

## COST OF KERBS AND GUTTERS—VARIOUS.

Brisbane streets have adopted the Hardwood kerb and concrete gutter, owing to the cost of working the local stones.

Superior Concrete Gutters are replacing the use of stone gutters in many localities.

12 x 6 **Hardwood Kerbs,** chamfered on edge, bolted to uprights, 4in. x 3in., x 30in. long, spaced 6 feet apart and coated with hot coal tar ; White Metal Concrete Gutter, 2 feet wide by 6in., slightly dished in centre. Cost, 5/– per run yard.

14 x 7 **Sandstone Kerb,** chamfered top edge, concrete gutter, 20 x 7in., dished 1½in. 7/– per yard run.

Ditto, with guttering, 24in. x 6in., two stones laid in sand and grouted with cement, 9/–

Ditto, with gutter, one stone, 10/–.

18 x 10, **Sandstone Kerb,** long stones, 24 x 9in. gutter, two stones for first-class work, 11/–

Ditto in one stone, 12/–

18 x 7 **Bluestone Kerb** gutter, two stones, 12 x 8in., dressed and tool chamfered edge. 27/– per yard.

# PLUMBERS' WORK.

## GALVANISED IRON.

### Measurements.

Galvanised Corrugated Iron Roofing and Ceilings by the Square or 100 super. feet.

In measuring eaves gutters, for every angle reckon 3 feet extra of gutter, or else add the price of the angles separately.

Ridge capping should be at least 24 gauge, although 22 gauge would be better still, being less than one-third the weight of 4lbs. lead.

Painting.—Gal. iron will last at least seven years without painting. If painted, non-poisonous paints should be used if the rain water is utilised for drinking purposes.

## GALVANISED CORRUGATED IRON.

In sheets, 4½ft., 5ft., 6ft., 7ft., 8ft., 9ft., and 10 ft. long by 2 feet 3 inches wide, with 3in. corrugations, or 2 feet wide with a lap of one corrugation, which is sufficient for fences, but a lap of two corrugations is required for ordinary roofs, with an end lap of at least 6 inches.

| WEIGHT PER SQUARE. | No. | No. |
|---|---|---|
| Gauges .. .. .. .. .. .. | 24 | 26 |
| Lbs. per square, lapped 2 corrugations .. | 180 | 130 |
| Lbs. per square, lapped 1 corrugation .. | 150 | 110 |
| **Squares per ton,** lapped 1 corrugation .. .. | 15.00 | 20.36 |
| Ditto do. lapped 2 corrugations .. | 12.44 | 17.23 |

This calculation is made from the average number of 5 and 6 feet sheets per ton, reckoning five of each for single lap and six of each for double lap and 12 inches for end laps per square.

| SQUARES PER TO . | 24 g. | 26 g. |
|---|---|---|
| 7ft. sheets cover, 2 sheets span, 6in. centre lap and 2 corrugations, making covering 13′6″ x 1′9″.. | 14.20 | 18.86 |
| 2 cases of 10 feet sheets, 1 sheet span .. .. | 15. 60 | 19.60 |

**Sheets per ton.**—These vary slightly with different makers, but the following is the average of several comparisons, 3in. corrugations :—

| Gauge. | 5 feet. | 6 feet. | 7 feet. | 8 feet. | 9 feet. | 10 feet. |
|---|---|---|---|---|---|---|
| 24 .. | 160 | 140 | 120 | 102 | 94 | 82 |
| 26 .. | 230 | 192 | 165 | 144 | 128 | 112 |
| Two Cases 26 gauge iron contain Orb | 232 | 194 | 166 | 146 | 128 | 114 |
| A1 Crown Brand | 230 | 190 | 166 | 146 | 128 | 112 |

**Prices per Sheet of Cor. Galv. Iron at £24 per Ton.**

| | 5 feet. | 6 feet. | 7 feet. | 8 feet. | 9 feet. | 10 feet. |
|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| 24 gauge .. | 3 0 | 3 6 | 4 1 | 4 8 | 5 4 | 6 0 |
| 26 gauge .. | 2 2 | 2 7½ | 3 1 | 3 6½ | 4 0 | 4 6 |

**GALVANISED CORRUGATED IRON.**

3-inch Corrugations.

Per Sheet.

| | 5ft. | 6ft. | 7ft. | 8ft. | 9ft. | 10ft. |
|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| 24 gauge .. | 2 5 | 2 10 | 3 4 | 3 11 | 4 7 | 5 4 |
| 26 gauge .. | 1 9 | 2 1 | 2 6 | 2 9 | 3 6 | 4 0 |
| Sheets in Case – – | | | | | | |
| 24 gauge .. | 83 | 70 | 60 | 51 | 45 | 41 |
| 26 gauge .. | 116 | 97 | 83 | 73 | 64 | 57 |

Per ton :—24 gauge—5 to 8 feet, £19 ; 9ft., £20 ; 10ft., £21.
26 gauge, add 10/– per ton.

**CEILING IRON.—Inch Corrugations.**

| Lengths .. | 5ft. | 6ft. | 7ft. | 8ft. | 9ft. | 10ft. |
|---|---|---|---|---|---|---|
| Sheets in Case | 122 | 99 | 86 | 75 | 67 | 60 |
| Per sheet .. | 1 10 | 2 3 | 2 7 | 3 0 | 3 6 | 4 1 |

5 to 8 feet, £21/–10/– ; 9ft., £22/10/– ; 10ft., £23/10/–.

**PLAIN GAL. SHEET IRON.**

| Length .. .. | .. 6ft. x 24in. | 6ft. x 30in. | 6ft. x 36in. | Per ton. |
|---|---|---|---|---|
| Sheets in case, 24g. .. | 89 | 70 | 59 | £19/10/– |
| Per sheet .. .. | 2 3 | 3 0 | 3 6 | |
| Sheets in case, 26g. .. | 120 | 98 | 80 | £20/10/– |
| Per sheet .. .. | 1 9 | 2 3 | 2 8 | |
| Sheets in case, 28g. .. | 140 | 112 | 88 | |
| Per sheet .. .. | 1 6 | 2 0 | 2 6 | £28/–/– |

Prices are subject to Market Fluctuations.

**Cast Iron Soil Pipe,** plain or with lugs, 4in.— per length 6ft... 7 6

**Cast Iron Rain Water Pipe and Fittings—**

| | Internal Diam. 2in. | 4in. | | Internal Diam. 2in. | 4in. |
|---|---|---|---|---|---|
| Pipe, per 6ft. length | 2 9 | 4 0 | Bends each | 1 3 | 2 6 |
| Sockets .. each | 0 9 | 1 6 | Junctions ,, | 1 9 | 2 9 |
| Shoes .. ,, | 1 0 | 2 0 | Tees ,, | 2 0 | 3 6 |

**Labour**—Fixing, from 3d. to 6d. per foot.

GALVANISED CORRUGATED IRON SKYLIGHTS.

6ft. to 10ft. sheet, 17/– to 21/– ; opening skylight, 21/– to 25/–.

## GUTTERING IN 6 FEET LENGTHS.

| O.G. & H.R. | S. | 26g. | 24g. | Q.R. | S. | 26g. | 24g. |
|---|---|---|---|---|---|---|---|
| 4in. .. | 0 8½ | 0 10 | 1 2 | 4in. .. | 0 9½ | 0 10½ | 1 3 |
| 4½in. | 0 9½ | 0 11 | 1 3 | 4½in. | 0 10 | 1 0 | 1 4 |
| 5in. .. | 0 10 | 1 0 | 1 4 | 5in. .. | 0 10½ | 1 1 | 1 5 |
| 6in. .. | 0 11 | 1 2 | 1 6 | 6in. .. | 1 0 | 1 3 | 1 7 |

## DOWN PIPES.—In 6ft. lengths.

| Round. | S. | 26g. | 24g. |
|---|---|---|---|
| 2in. per length .. .. .. .. | 0 9 | 0 11 | 1 0 |
| 2½in. ,, .. .. .. .. | 0 10½ | 1 0 | 1 3 |
| 3in. ,, .. .. .. .. | 0 11 | 1 2 | 1 6 |
| 3½in. ,, .. .. .. .. | 1 1 | 1 4 | 1 9 |
| 4in. ,, .. .. .. .. | 1 3 | 1 8 | 1 10 |
| 5in. ,, .. .. .. .. | 1 10 | 2 0 | 2 6 |
| 6in. ,, .. .. .. .. | 2 0 | 2 6 | 3 0 |

**Labour,**—1½d. to 4d. per foot.

| Square. | S. | 26g. | 24g. |
|---|---|---|---|
| 2in. x 3in. per length .. .. | 1 3 | 1 6 | 1 9 |
| 2in. x 4in. ,, .. .. .. | 1 4 | 1 7 | 1 10 |
| 3in. x 4in. ,, .. .. .. | 1 6 | 1 9 | 2 0 |
| 4in. x 4in. ,, .. .. .. | 1 8 | 1 10 | 2 4 |

## RIDGING.

| | S. | 26g. | 24g. |
|---|---|---|---|
| 12in. per length .. .. .. | 0 11 | 1 1 | 1 6 |
| 14in. ,, .. .. .. .. | 1 1 | 1 4 | 1 8 |
| 15in. ,, .. .. .. .. | 1 2 | 1 5 | 1 9 |
| 16in. ,, .. .. .. .. | 1 3 | 1 6 | 1 10 |
| 18in. ,, .. .. .. .. | 1 4 | 1 7 | 2 0 |

**Labour,**—4d. per foot.

## O.G. DOWN PIPE HEADS.

2in., each 2/– ; 3in., each, 2/3 ; 4in., each, 3/3.

Fixing,—1/– to 1/6 each.

Labour, &c., 2d. to 4d. per foot run.

**To ascertain prices fixed.**—Double the price of guttering or down pipes.

Spikes and Tubes, from 10d. per doz. ; Gutter Angles, from 8d. each ; Pipe Elbows, from 6d. each.

Nozzles, in gutter, 5d. each. Stop Ends, in gutter, 4½d. each. Brackets, H.R., Q.R., and O.G. Short, per doz., 1/6 ; long, doz., 2/–. Slip Joints to gutter, 3½d. per length.

## COWLS.

entilating Cowls, 24 gauge, 2in., 1/8 ; 3in., 2/2 ; 4in., 2/7 ; 6in., 4/3 ; 9in., 8/6 each.
Gal. C.I. Mica Flap Induct Cowls, 4in., 5/– each.
Induct Cowls, 4in., 1/1 each.
Chimney Cowls, from 6/6 each.
Malt House Cowls, from 10/– each.
Lobster Back Cowls, 2in., 1/3 ; 3in., 1/8 ; 4in., 2/3 each.
**Vent Pipes**—
24 gauge, painted inside, 2in., 1/– ; 4in., 2/2 per 6ft. length ; 6in., 3/– per 6ft. length.

## CISTERNS.

Gal. W.C. Cisterns, 24 gauge, painted inside, with overflow, 14/6, 15/9 each.
Zinc W.C. Cisterns, 12 gauge, painted inside, with overflow, each 18/3.
Automatic Cistern, extra, 10/–. Flush Pipes, 4/3.
**D Sink**—
Traps and Covers—6in., 1/7 ; 8in., 2/4 ; 10in., 3/2 ; 12in., 4/– each
Wrought Iron Gratings, for Gully Traps, Round or Square, 10in., 2/9 ; 12in., 3/– ; 14in., 3/9 each.
Cast Iron Footpath Boxes, 2/6.
Gal. Roofing Nails, 2in. and 2½in., per lb., 3d.
Lead Washers, per lb., 2½d.
Screws, per lb., 5d.
Bolts and Nuts, per lb., 5d.

## GALVANISED CORRUGATED IRON.

| **Labour only,** per square. | s. | d. |
|---|---|---|
| Hip roofs, covered with corrugated gal. iron, 24 to 26 gauge, double laps | 6 | 0 |
| Gable roofs, do. do. | 4 | 6 |
| Ditto, no cutting, and 4 sheets run flat roofs | 3 | 6 |
| Balcony, verandah, curved roofs | 8 0 to 10 | 0 |
| Fences, 6 ft. sheets, screwed, bottom, top, middle, and sides of sheets | 3 | 6 |

Present wages of Plumber, per hour, 1/3.

**Labour—Downpipes, Gutterings**—

| | | |
|---|---|---|
| Fixing down pipe, including solder, per foot | 1½d to | 0 4 |
| ,, Spouting or eaves, guttering, per foot | 2d. to | 0 4 |
| ,, Plain sheet gal. iron on partitions, advt. hoardings, nailed around edges with clouts 4ft. apart, per square | | 8 6 |
| ,, Ridges, including screws and washers, per 6ft. length | 1 6 to | 2 6 |

**Curving Galvanised Corrugated Iron,** per sheet—

| | | |
|---|---|---|
| For verandahs, bullnosed O.G. or dished | 0 | 3 |
| For tanks, etc., half circle, 6d. ; circle | 0 | 9 |

## LEAD.

### Patent Lead Pipes.

*Per lin. yard, at* 23s. 4d. *per cwt., or* 2½d. *per lb.*

| Diameter, inches. | Light. | | | Medium. | | | Strong. | | | Soldered joints, each | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | lbs. | s. | d. | lbs. | s. | d. | lbs. | s. | d. | s. | d. |
| ½ | 3 | 0 | 7½ | 4½ | 0 | 11½ | 6 | 1 | 3 | 2 | 0 |
| ¾ | 6 | 1 | 3 | 7 | 1 | 5½ | 9 | 1 | 10½ | 2 | 6 |
| 1 | 8 | 1 | 8 | 10 | 2 | 1 | 12 | 2 | 6 | 2 | 9 |
| 1¼ | 10 | 2 | 1 | 12 | 2 | 6 | 16 | 3 | 4 | 3 | 0 |
| 1½ | 12 | 2 | 6 | 16 | 3 | 4 | 20 | 4 | 2 | 3 | 3 |
| 2 | 18 | 3 | 9 | 24 | 5 | 0 | 30 | 6 | 3 | 3 | 6 |

If 18s. 8d. per cwt. or 2d. per lb. deduct one-fifth.

### Cost of Laying Surface Pipes.

| | £ | s. | d. |
|---|---|---|---|
| Say 20 yds. ¾ inch patent lead pipe, as above, for high pressure, at 1s. 10½d. per yard .. .. .. | 1 | 17 | 6 |
| Labour in laying down pipe, including opening ground, boring main, cutting through and making good to walls, floors, &c., 20 yds. at 1s. 3d. per yard .. .. | 1 | 5 | 0 |
| Say 5 joints, at 2s 6d. each, as above .. ... .. | 0 | 12 | 6 |
| ¾ inch Stop-cock, 6s. ; Bib-cock, 6s. .. .. .. | 0 | 12 | 0 |

By altering the above as required, any estimate may be made for any length or size pipe, &c., the labour in laying down being about the same for any ordinary size pipe, either lead or iron.

For prices of black and galvanised iron pipes see Index.

*Medium* pipe is generally used in Sydney, but *Strong* pipe in Melbourne, on account of the greater water pressure from the Yan Yean Reservoir.

On account of the poisonous nature of lead pipe, it is rarely used in Melbourne or Sydney for water supply, except for awkward bends and other exceptional cases, but it is always used to connect the gas mains with the metres, even the *strong or thickest lead pipe* is commonly used in Sydney for gas metres, although the thinnest, or light lead pipe would be more than strong enough.

*Galvanized Iron Pipes*, with screwed ends and T. pieces or square junctions, bends or quadrants and angle junctions or springs, from 30 degrees to 60 degrees, are generally used for water supply up to 3 ins. bore. Above this size they are mostly coated with coal pitch varnish.

*Black or common wrought Iron Pipes* up to 3 ins. bore, are always used for gas, and corrode or oxidise less than gal. iron pipes.

## LEAD.

### SHEET LEAD.

**Stock Sizes 32ft. long x 7ft. 6in. Wide.**

| Weight per Sup. ft. | Approximate Weight of Roll. Cwt. | Qrs. | Llbs. | Weight per Sup. ft. | Approximate Weight of Roll. Cwt. | Qrs. | Lbs. |
|---|---|---|---|---|---|---|---|
| 2lbs. | 5 | 1 | 0 | 6lbs. | 13 | 0 | 0 |
| 3lbs. | 6 | 2 | 0 | 7lbs. | 15 | 0 | 0 |
| 4lbs. | 8 | 2 | 0 | 8lbs. | 17 | 0 | 0 |
| 5lbs. | 10 | 3 | 0 | 9lbs. | 19 | 1 | 0 |

### COMPOSITION PIPE.

| Inside Diam. | Outside Diam. | Weight per Yard. | Inside Diam. | Outside Diam. | Weight per Yard. |
|---|---|---|---|---|---|
| ⅛in. | 3/16in. | 2¼oz. | 1 in. | 1⅛in. | 1lb. 12oz. |
| ¼in. | 5/16in. | 4oz. | 1¼in. | 1 11/32in. | 2lbs. 5oz. |
| ⅜in. | 7/16in. | 6oz. | 1½in. | 1⅝in. | 3lbs. 4oz. |
| ½in. | 9/16in. | 11½oz. | 1¾in. | 1 29/32in. | 4lbs. 3oz. |
| ⅝in. | 23/32in. | 13oz. | 2 in. | 2 3/16in. | 4lbs. 11oz. |
| ¾in. | 13/16in. | 17oz. | 2in. | 2¼in. | 8lbs. |

### LEAD SOIL PIPE.

**In 10ft. lengths.**

| Inside Diam. | Gauge per Sup. ft. | Weight per Yard. | Inside Diam. | Gauge per Sup. ft. | Weight per Yard. |
|---|---|---|---|---|---|
| 1½in. | 7lbs. | 8lbs. | 3½in. | 7lbs. | 18lbs. |
| 2 in. | ,, | 10lbs. | 4 in. | ,, | 21lbs. |
| 2½in. | ,, | 13lbs. | 4½in. | ,, | 24lbs. |
| 3 in. | ,, | 15lbs. | 5 in. | ,, | 27lbs. |

### LEAD WASTE PIPE.

**Lengths of 10 feet.**

| Inside Diam. | Gauge per Sup. ft. | Weight per Yard. | Inside Diam. | Gauge per Sup. ft. | Weight per Yard. |
|---|---|---|---|---|---|
| 1½in. | 6lbs. | 7lbs. | 3½in. | 6lbs. | 16lbs. |
| 2 in. | ,, | 9lbs. | 4 in. | ,, | 18lbs. |
| 2½in. | ,, | 12lbs. | 4½in. | ,, | 20lbs. |
| 3 in. | ,, | 13½in. | 5 in. | ,, | 22½lbs. |

### BLOCK TIN PIPE.

| Inside Diam. | Outside Diam. | Weight per Yard. | Inside Diam. | Outside Diam. | Weight per Yard. |
|---|---|---|---|---|---|
| ¼in. | ⅜in. | 13oz. | ⅝in. | ¾in. | 1lb. 3oz. |
| ⅜in. | ½in. | 1lb. 3oz. | ¾in. | ⅞in. | 2lb. 4oz. |
| ½in. | ⅝in. | 1lb. 5oz. | 1in. | 1⅛in. | 3lb. 3oz. |

## LEAD.

**Lead Traps,** with screw, for outlet—

| | 1½in. | 2in. | 2½in. | 3in. |
|---|---|---|---|---|
| **P.** Trap .. .. | 1 9 | 2 6 | 3 9 | 4 3 |
| **S.** ,, .. .. | 2 2 | 2 10 | 4 3 | 5 6 |
| Running (No. 15) .. | 1 9 | 2 6 | 3 9 | — |

**Trade Prices** (subject to Market Fluctuations), based on ruling prices, London—

| | £ | s. | d. |
|---|---|---|---|
| Sheet Lead, 3 to 7lbs., per ton .. .. .. .. | 26 | 0 | 0 |
| (2lb. sheets, 20/– ; 2½lbs., 10/– per ton extra.) | | | |
| Lead Pipe, ¼ to 2in., in coils per ton .. .. .. | 27 | 10 | 0 |
| Lead Pipe, 1 to 1½in., short lengths, per ton .. .. | 28 | 10 | 0 |
| Lead Pipe, 1¼in. to 5in., straight lengths, per ton .. | 29 | 10 | 0 |
| Compo. Pipe, ¼ to 2in. (¼in., 4/– per cwt. extra), per ton | 30 | 10 | 0 |
| Tin-washed Lead Pipe, ½in. upwards, per ton .. .. | 32 | 10 | 0 |
| Tin Pipe, ⅛ to 2in., per lb. .. .. .. .. .. | 0 | 2 | 2 |
| Sheets or coils cut to sizes, 1/– per cwt. extra. | | | |
| Pig Lead, in 95lb. ingots, per ton .. .. .. .. | 23 | 0 | 0 |

## LEAD.

### Labour.

**Laying Sheet Lead—**

| Including solder, hooks, nails, &c. | per cwt. |
|---|---|
| Laying lead flats and floors, 10ft. lengths .. .. .. | 4 0 |
| Small flats, cut sheets .. .. .. .. .. .. | 5 0 |
| Laying Gutters .. .. .. .. .. .. | 6 0 |
| Ridges, valleys and hips .. .. .. .. | 5 0 |
| Step flashings .. .. .. .. .. .. | 7 0 |
| Damp course to chimneys, walls, and windows, 3lb. and 4lb. .. .. .. .. .. .. | 5 0 |
| Lining Small Cisterns, 5lb. lead .. .. .. .. | 8 0 |
| Lining large cistern troughs .. .. .. .. .. | 6 0 |
| Laying hips, ridges and flashings to dormers or turrets, 10/– to | 12 0 |
| Add for every 10 feet above 30 ft. high, extra .. .. .. | 0 6 |
| Soldering seams per foot run .. .. .. .. .. | 1 6 |
| Making single welt, per ft. run .. .. .. .. .. | 0 6 |
| Double welt, per foot run .. .. .. .. .. | 0 7 |
| Bedding in white lead, 3d. ; close copper nailing, ft. run .. | 0 3 |

**Labour to lead pipes—**

| | | | | | | |
|---|---|---|---|---|---|---|
| Laying and fixing lead pipes, ½ to ¾in. diam., per ft. run .. | | | | | | 0 3 |
| Ditto. | do. | do. | 1 to 1½in. | ,, | ,, ,, .. | 0 6 |
| Ditto. | do. | do. | 1½ to 2in. | ,, | ,, ,, .. | 0 9 |

**Fixing Soil or Waste Pipe,** 3½in. diam. .. .. .. .. 5 0

## WATER AND GAS PIPES

Material and labour, including Tees, Elbows, complete.

| Pipes. | Approximate. Labour, per ft. | Fixed, per foot run. Water. | Gas. |
|---|---|---|---|
| ½in. inside diam. .. | 0 2½ | 0 4 | 0 3½ |
| ¾in. ,, .. | 0 3 | 0 7 | 0 6 |
| 1 in. ,, .. | 0 4 | 0 10 | 0 9 |
| 1¼in. ,, .. | 0 6 | 1 3 | 1 0 |
| 1½in. ,, .. | 0 9 | 1 6 | 1 3 |
| 1¾in. ,, .. | 1 0 | 1 9 | 1 6 |
| 2 in. ,, .. | 1 3 | 2 0 | 1 9 |
| 2½in. ,, .. | 1 6 | 3 4 | 2 10 |

The number of bends, junctions, cuts, or short lengths increase the cost.

## CHARGES FOR REINSTATEMENT OF ROADS AND FOOTWAYS.

(Adopted by the Municipal Council of Sydney.)

Licenses for Water, 2/6 ; Drainage, 2/6 ; Down Pipes, 1/6 each.

**Restoration of Footways—**

Along and across footways, 6ft. wide and over, per opening 10 0
Ditto. do. under 6ft. wide, per opening .. .. 6 0
Ditto. do. over 12ft. wide, 10/– to be paid, and account will be rendered for balance.
Openings not exceeding 3ft. x 3ft., for fixing Buchan traps, stop-cocks, repairing leaks, &c., per opening .. .. 6 0

**Restoration of Roadways—**

Openings not exceeding 20ft. x 1ft. 6in. .. .. .. 10 0
Openings over 20ft. long, 10/– deposit, and account will be rendered for balance.
Openings not exceeding 3ft. x 3ft. for turning off water, &c. 5 0
Lanes 20ft. wide and under (roads and footways) .. .. 10 0
Woodblocked streets and cube-setts on concrete—account will be rendered.

The person opening the roadway or footway is to temporarily restore same when work is completed.

Sydney, 24th March, 1903.

W. M. GORDON,

City Surveyor.

**Water Meters are hired out by the M.B.W.S. & S., Sydney, per year—**

| | | | | | |
|---|---|---|---|---|---|
| ¾in. .. | 6 0 | 1½in. .. | 10 6 | 4in. .. | 27 0 |
| 1 in. .. | 7 0 | 2 in. .. | 16 6 | 6in. .. | 97 6 |
| 1¼in. .. | 8 6 | 3in. .. | 23 0 | | |

## BIRMINGHAM IRON TUBE TRADE LIST.

### WROUGHT IRON TUBES AND FITTINGS, FOR GAS, WATER, AND STEAM.

| Internal Diam. inches | ⅛, ¼ | ⅜ | ½ | ¾ | 1 | 1¼ | 1½ | 1¾ | 2 | 2¼ |
|---|---|---|---|---|---|---|---|---|---|---|
| **TUBES.** | | | | | | | | | | |
| Tubes, 2ft. up, foot | 3d | 3½d | 4½d | 6d | 8½d | 1/– | 1/3 | 1/6 | 1/9 | 2/6 |
| Pieces, 12-23½in. each | 8d | 9d | 11d | 1/3 | 1/9 | 2/6 | 3/3 | 3/11 | 4/7 | 6/9 |
| Pieces, 4 to 11½ „ | 5d | 5½d | 7d | 10d | 1/1 | 1/6 | 2/– | 2/5 | 2/10 | 4/3 |
| Longscrews— | | | | | | | | | | |
| 12 to 23½in. „ | 9d | 10d | 1/– | 1/4 | 1/10 | 2/8 | 3/6 | 4/3 | 5/– | 7/6 |
| 4 to 11½ in. „ | 6d | 6½d | 8d | 10d | 1/2 | 1/8 | 2/3 | 2/9 | 3/3 | 5/– |
| Bends .. .. „ | 7d | 8d | 10d | 1/– | 1/6 | 2/6 | 3/– | 4/– | 5/– | 8/6 |
| Springs, not socketed | 5d | 6d | 7d | 9d | 1/1½ | 1/11 | 2/3½ | 3/1 | 3/11 | 6/9 |
| **FITTINGS—** | | | | | | | | | | |
| Socket Union, Pipe | | | | | | | | | | |
| Union each | 2/– | 2/6 | 3/– | 4/– | 5/6 | 6/9 | 8/– | 9/– | 10/– | 15/– |
| Elbows, Square „ | 8½d | 9d | 10d | 1/– | 1/4 | 1/10 | 2/5 | 3/– | 3/10 | 6/3 |
| Tees .. .. „ | 9d | 10d | 11d | 1/2 | 1/5 | 2/– | 2/6 | 3/2 | 4/3 | 6/6 |
| Crosses .. .. „ | 1/4 | 1/6 | 1/11 | 2/4 | 3/– | 4/– | 4/10 | 6/– | 7/9 | 14/– |
| Plain Sockets „ | 2d | 2d | 3d | 3½d | 4½d | 6½d | 8½d | 11d | 1/1 | 1/9 |
| Dimin. Sockets „ | 3d | 4d | 5d | 6d | 7d | 9d | 11d | 1/2 | 1/4 | 2/3 |
| Flanges .. „ | 9d | 10d | 1/– | 1/2 | 1/4 | 1/9 | 2/– | 2/3 | 2/9 | 4/– |
| Caps .. .. „ | 3½d | 3½d | 5d | 6d | 8d | 1/– | 1/3 | 1/7 | 2/– | 3/– |
| Plugs .. .. „ | 3d | 3d | 4d | 5d | 6d | 8d | 10d | 1/– | 1/3 | 2/– |
| Backnuts .. „ | 2d | 2d | 3d | 3½d | 5d | 6d | 8d | 10d | 1/1 | 1/9 |
| Nipples .. „ | 2d | 2d | 3d | 3½d | 4d | 6d | 8d | 10d | 1/– | 1/9 |
| Barrel Nipples „ | 5d | 5d | 7½d | 9d | 10d | 1/3 | 1/8 | 2/1 | 2/6 | 4/4 |
| Union Bends „ | 2/6 | 3/– | 3/9 | 5/– | 6/3 | 8/6 | 10/– | 11/6 | 13/6 | 21/– |
| Elbows, Round „ | 9½d | 11d | 1/– | 1/3 | 1/6 | 2/1 | 2/7 | 3/6 | 4/6 | 6/9 |
| Iron Main Cocks „ | 2/3 | 2/9 | 3/6 | 4/6 | 6/6 | 8/6 | 11/– | 14/– | 18/– | 27/– |
| Iron Main Cocks, with brass pgs. „ | .. | 7/– | 8/9 | 11/6 | 16/– | 21/6 | 28/– | 35/– | 45/– | 68/– |

Tubes cut to exact lengths, if screwed and socketed, are charged 2½ per cent. less gross discount than random lengths.

Tubes in random lengths, not screwed, are charged at the current discount, with an extra allowance of 2½ per cent. off the net.

Tubes cut to exact lengths, and not screwed, are charged as screwed and socketed in random lengths.

Tubes screwed and sent without sockets, are charged at the current discount with an extra 1¼ per cent. off the net.

All lengths 4″ to 2ft. are considered pieces.

Intermediate diameters are charged at the next higher price.

WROUGHT IRON TUBES AND FITTINGS FOR GAS, WATER, AND STEAM.—*Continued.*

| Internal Diam. inches | $2\frac{1}{2}$ | $2\frac{3}{4}$ | 3 | $3\frac{1}{2}$ | 4 | $4\frac{1}{2}$ | 5 | $5\frac{1}{2}$ | 6 |
|---|---|---|---|---|---|---|---|---|---|
| **TUBES.** | | | | | | | | | |
| Tubes, 2ft. up, per foot | 3/– | 3/3 | 3/6 | 4/6 | 5/6 | 6/– | 6/9 | 7/9 | 8/9 |
| Pieces, 12 to $23\frac{1}{2}$in. each | 8/6 | 9/6 | 10/6 | 13/2 | 16/– | 21/– | 24/6 | 29/6 | 35/– |
| Pieces, 4 to $11\frac{1}{2}$in. ,, | 5/6 | 6/3 | 7/– | 9/1 | 11/– | 15/6 | 18/3 | 22/3 | 26/6 |
| Longscrews— | | | | | | | | | |
| 12 to $23\frac{1}{2}$in. ,, | 9/7 | 11/3 | 12/– | 15/3 | 17/– | 23/3 | 27/– | 32/6 | 38/6 |
| 4 to $11\frac{1}{2}$in. ,, | 6/4 | 7/6 | 8/3 | 10/9 | 12/3 | 17/– | 20/3 | 24/6 | 29/3 |
| Bends ,, | 12/– | 15/– | 18/– | 25/– | 32/6 | 80/– | 105/ | 135/ | 150/ |
| Springs, not socketed ,, | 9/6 | 12/– | 14/6 | 20/– | 26/6 | 70/– | 93/– | 120/ | 132/ |
| **FITTINGS.** | | | | | | | | | |
| Socket Union, Pipe Union each | 17/6 | 20/– | 22/6 | 27/6 | 35/– | 48/– | 66/– | 84/– | 105/ |
| Elbows, Square ,, | 9/– | 11/6 | 14/– | 22/– | 28/– | 75/– | 95/– | 120/ | 150/ |
| Tees ,, | 9/6 | 12/6 | 16/6 | 24/– | 30/– | 78/– | 98/– | 125/ | 155/ |
| Crosses ,, | 21/4 | 28/– | 40/– | 56/– | 66/8 | 175/ | 220/ | 280/ | 350/ |
| Plain Sockets ,, | 2/6 | 3/– | 3/6 | 5/– | 6/– | 10/– | 12/– | 15/– | 18/– |
| Diminished Sockets ,, | 3/3 | 4/– | 5/– | 7/– | 9/– | 25/– | 35/– | 45/– | 55/– |
| Flanges ,, | 5/– | 6/9 | 8/6 | 10/– | 11/6 | 16/– | 18/– | 23/– | 27/– |
| Caps .. .. ,, | 4/4 | 5/3 | 6/– | 9/9 | 10/6 | 25/– | 30/– | 37/6 | 45/– |
| Plugs .. .. ,, | 2/6 | 3/6 | 4/9 | 7/– | 10/– | 22/– | 30/– | 39/– | 48/– |
| Backnuts .. .. ,, | 2/3 | 3/– | 3/6 | 4/6 | 5/6 | 14/– | 18/– | 21/– | 26/– |
| Nipples .. .. ,, | 2/3 | 3/– | 3/6 | 4/6 | 5/6 | 14/– | 18/– | 21/– | 26/– |
| Barrel Nipples ,, | 5/8 | 7/6 | 8/9 | 11/3 | 13/9 | 28/– | 36/– | 42/– | 52/– |
| Union Bends ,, | 27/– | 32/– | 37/– | 49/– | 58/– | 78/– | 100/ | 135/ | 160/ |
| Elbows, Round ,, | 10/– | 13/– | 17/– | 25/– | 32/– | 75/– | 95/– | 120/ | 150/ |
| Iron Main Cocks ,, | 40/– | 50/– | 60/– | 85/– | 110/ | 210/ | 270/ | 360/ | 420/ |
| Iron Main Cocks, with brass plugs .. ,, | 100/ | 112/ | 125/ | 212/ | 250/ | 360/ | 450/ | 570/ | 660/ |
| Round Way I. Cocks ,, | 60/– | 65/– | 75/– | 120/ | 160/ | .. | .. | .. | .. |
| Cock Spanners, Wt. I. ,, | 6/– | 7/6 | 9/– | 12/– | 14/– | 16/– | 19/– | 22/– | 24/– |
| Ditto. Mal. cast Iron ,, | 6/– | 7/6 | 9/– | 12/– | 14/– | 16/– | 19/– | 22/– | 24/– |

The above quotations are subject to a varying discount.

Present Trade discount off list—70 per cent. on black Iron (gas); $64\frac{1}{2}$ per cent. gal. iron (water); 60 per cent., gal. iron (steam).

Tubes coated inside and outside with Dr. Angus Smith's or any other solution, are charged at $2\frac{1}{2}$ per cent. less gross discount.

Orders for screwed and socketed Tubes are always executed in Gas quality, if no other quality is specified.

**Laying on Gas in the Cities.** s. d.

Connecting with meter, including all necessary T. and angle pieces, cocks, iron and tin pipes, or tubes fixed to receive gasaliers, at per point or connection .. .. .. 12 6

N.B.—Fittings, gasaliers, &c., generally supplied or chosen by the proprietor. The Sydney Gas Company supply and lay 20 feet of service pipe from the main to meter.

In laying gas-pipes through floors, the *centre of the joists* should not be cut away, because the joists are weakened in proportion to the depth cut away, whereas the ends of the joists (to one-eighth of the span) may be cut away to one-third of their depth, or at one-quarter of the span to one-sixth of their depth, without in any way weakening them.

Composition (lead and tin) tubing is not approved of by the Gas Co. for gas connections. In Sydney the price is about 3d. per lb.

## EXCAVATION.

**Labour.**

For Plumber's Pipes and Filling in same, per yard run.

12in. to 2ft. deep .. .. .. .. .. 0 3 to 0 6
3ft. deep x 12in. wide.. .. .. .. .. .. 0 9
Ditto, extra, through blue metal road, 12in. .. .. .. 1 6
Ditto do. soft sandstone rock, 2ft. deep.. .. .. 2 6

## SUNDRIES.

Gas Cooking Stoves, all sizes, from upwards .. .. .. 3 6 0
Gas Stove for laundries, offices, parlors, bedrooms, nurseries, &c., from upwards .. .. .. .. .. 2 0 0
Doctor's or Chemist's lamp, with bull's eye coloured glasses, writing, &c., from .. .. .. .. .. .. 3 0 0
Vapor Baths for invalids, heated by gas,.. .. .. .. 5 0 0
Baths for schools, &c., heated by gas in 20 minutes .. .. 8 0 0
Patent portable water heater (heated by gas) for a hot bath in a few minutes at a small cost, from.. .. .. .. 3 10 0
Asbestos stoves for drawing rooms, bedrooms, offices, &c., heated by gas, complete, from .. .. .. .. 1 0 0

*See* LIGHTING AND HEATING.

## GAS METERS.—Each.

**Wet Meters,** by Parkinson & Co., 3 lights, £2/0/6 ; 5 lights, 2/11/– ; 10 lights, 3/11/– ; 20 lights, 5/6/– ; 30 lights, 8/1/–.

The meters are generally supplied and fixed by the Gas Companies, but these are the present prices. There are also 15, 20, 25, 30, 50 and 100 light or station meters.

## GASALIERS, &c.—Each.

Single light gas brackets, from .. .. .. .. .. 0 1 6
Double jointed ditto. do. .. .. .. .. .. 0 3 0
2 light water joint gasaliers, do .. .. .. .. .. 1 10 0
3 do. do. do. .. .. .. .. .. 2 10 0

**Labour in laying** or fixing and jointing gas pipes, from 3d. to 6d. per lineal foot, according to quantity and joints.

## SANITARY WARE.

### PEDESTAL CLOSET PANS.

| | £ | s. | d. |
|---|---|---|---|
| Cane and white Closets, Sanitas, with S or P traps, each .. | 1 | 0 | 0 |
| White do. do. do. .. .. .. .. .. | 1 | 2 | 6 |
| Cane and white massive fireclay Closets, with S or P traps.. | 1 | 12 | 6 |
| White do. do. do. .. .. .. .. .. | 1 | 15 | 0 |
| Cane and white do do., fitted with wood slips in lieu of seats | 1 | 17 | 6 |
| Cane and white " Compound " Closets, with S or P traps .. | 2 | 2 | 6 |
| White do. do. do. .. .. .. .. .. | 2 | 7 | 6 |
| Cane and White " Column " Closets, with lead do... .. | 2 | 10 | 0 |
| White do. do. do. .. .. .. .. .. | 2 | 12 | 6 |

### CLOSET SEATS.

Hinged Seats, double thickness, with strong cast brass highes, rubber buffers and cast iron brackets—

Plain Pine, 12/6; Polished Pine, 13/6; Polished Cedar, 17/6 each.

**Swing Seats,** made the same as above, with cast iron levers and weights—

Plain Pine, 18/–; Polished Pine, 19/–; Polished Cedar, 22/– each.

### Imported Seats.

| | Single Flap. | Double Flap. |
|---|---|---|
| Oak .. .. .. .. .. | 10/– | 15/– |
| Real Cherry .. .. .. .. | 9/– | 14/– |
| Maple .. .. .. .. .. | 15/– | 22/– |

### BATHS.

| | |
|---|---|
| 5′6″ Best Quality Enamel Cast Iron Baths.. .. .. | 7/–/– |
| 6′0″ do. do. do. .. .. .. .. .. | 8/–/– |

### LAVATORY BASINS.

Earthenware Lavatory Basins with Plated Washer and Plug, Staple and Chain, ½″ Upright Pillar Cock, and Cast Iron Brackets and Frame—

Nos. 1, 2, 3 and 4, " Dee " flat back, each, £2/5/6; £2/12/6; £2/17/6; £3/5/–.

Nos. 1, 2, 3, " Clyde," each, £2/12/6; £3/–/–; £3/17/6.

Nos. 1 and 2, " Tay," Angle, £2/3/– and £2/14/6

Nos. 1 and 2, " Neva," Angle, £2/7/6 and £3/–/–.

Lavatory Basins only, round or flat back, with or without skirting attached, from 3/– to 30/–.

Fancy Cut Lavatory Brackets, for fixing above basins, 7/6 to 24/– set.

## SANITARY.

### LAVATORY RANGES.

J. Tylor & Sons' Strong Massive White Glazed Fire-clay "York" Lavatory Ranges, with overlap joints, fitted with ½" Upright Plated Pillar Cocks, 1¼in. Washers and Plugs, Staples and Chains, and Cast Iron Brackets, with floor supports or Cast Iron Cantilevers, for building into wall, per basin, £3/12/6.

Enamel Iron "Bromsgrove" Lavatories, fitted the same as above, per basin, £2/15/–.

### URINALS.

Fireclay White Glazed "Federal" Urinals, with fireclay cistern and polished copper pipes, per stall, £10/–/–.

Single Flat Back, without lip, 13in. wide, white glazed, each 13/6.

Ditto. with lip, 14½in. wide, white glazed, each 15/6

Angular, with lip, 15in. wide, white glazed, each 17/6.

### W.C. CISTERNS.

Unfixed.

20 gal. Galvanised Cisterns, 24 gauge, with overflow, painted inside, 16/– each.

1½" Flush Pipes for above, 4/–.

2 gal. Cast Iron Cisterns, glass enamel inside, with lead flush pipe, 40/– each.

**Patent Automatic Dry Earth Closet,** in stained pine, £4/10/–.

### ESTIMATE FOR WATER CLOSET.

| | | | |
|---|---|---|---|
| Pedestal closet | 1 | 0 | 0 |
| Oak seat, single flap | 0 | 10 | 0 |
| 20 gallon Cistern | 0 | 15 | 0 |
| 1½" Flush Pipe, lead | 0 | 4 | 0 |
| ½" ball stop-cock | 0 | 2 | 6 |
| Lever and chain | 0 | 1 | 6 |
| 12ft. ½" connecting water pipe, at 4d. | 0 | 4 | 0 |
| 12ft. 2" vent pipe, fixed, at 4d. | 0 | 4 | 0 |
| Ventilating Cowl, fixed | 0 | 2 | 0 |
| | 3 | 3 | 0 |
| Plumber's labour | 1 | 17 | 0 |
| Approximate Net cost | £5 | 0 | 0 |

If on 1st floor, add for cast iron and lead soil pipes, &c.

**Force and Lift Pump,** Warner's best 3½ inch brass barrel force and lift pump with air vessel and delivery tap to supply yard cistern and house, including 100 feet of 2 inch and 1½ inch galvanised iron pipe, taps, connections, &c., complete, £10 to £20.

**Lift pump** (4 inch) for house work, fixed in yard, with 15 feet gal. iron pipe, from £2 10s. to £4.

Wheel and pinion gear with cast iron frame, £10. *See* Index, PUMPS.

## BATHS ONLY.—Trade Price.

**Galvanised Iron Baths,** strongly stayed, with 2½in. brass plug and Washer—

| | 5 feet. | 5½ feet. | 6 feet. |
|---|---|---|---|
| 62 gauge iron .. .. | 14/3 | 15/9 | 17/– |
| 24 ,, ,, .. .. .. | 17/3 | 18/9 | 19/9 |

Galvanised Iron Baths, flanged for casing in, 1/6 less than the above prices.

**Cast Iron Bath**—Size, 5ft. 9½in. long ; 2ft. 5in. wide ; 1ft. 8½in. high—White Silicate Enamelled inside, Oak grained outside, American pattern, with fixed feet, with plug and washer, without overflow .. .. .. .. .. .. .. £3 to £4

**Gal. Steel Enamelled Bath,** size, 6ft. 1in. ; 2ft. 4½in. ; 1ft. 11in. high—Four coats of Enamel inside, Oak rim .. .. .. .. £4

**Gal. Steel Baths,** very strong, with cast frame and legs, with plug and washer, 5½ft. 50/– ; 6ft. 60/–

Paint Enamelled Iron Baths, French pattern, fitted with nickel-plated waste and overflow, with strong brass elbow union, all ready for pipes and plumbers' connections 2/10/– to £6.

Porcelain Enamelled Bath, with all connections in ornamental brass, and pipes complete .. .. .. .. £6 to 12 0 0

## SHOWER.

**Copper Shower Heads,** for fixing over baths—

| 6in. | 7in. | 8in. | 10in. | 12in. |
|---|---|---|---|---|
| 2/– | 2/6 | 3/– | 4/3 | 7/6 |

## LAUNDRY TUBS, &c.

| | 2 compartments. | 3 compartments. |
|---|---|---|
| **Galv. Iron Fixed Tubs**— | | |
| 26 gauge .. .. .. .. .. | 13/– | 17/– |
| 24 gauge .. .. .. .. .. | 16/– | 20/– |
| **Wood Laundry Tubs** .. .. .. | 28/– | 40/– |

## SINKS.

**Porcelain Enamelled Cast Iron Sinks,** with Plug and Washer—

| Inside measurement, inches | 15 | 18 | 21 | 24 | 27 | 30 |
|---|---|---|---|---|---|---|
| Net prices, each .. .. | 12/– | 14/– | 16/– | 18/– | 20/– | 23/– |

**Fire Clay Sinks,** White Glazed inside, Cane Glazed outside—

Outside measurement—

| | |
|---|---|
| 21in. long x 15in. wide x 8½in. deep, with plug and washer | 25/– |
| 24in long x 15in wide x 8½in. deep .. .. .. .. | 28/– |
| 27in. long x 17in. wide x 9in. deep .. .. .. .. | 37/6 |

## N.S.W. GOVERNMENT SCHEDULE RATES

Based on the present market price of Materials.

For comparison only, or as a guide to small items. Fixed complete including profit.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2in. S lead traps, with screws | 5 | 6 | 3in. lead traps, screws .. | 10 | 10 |
| 2½in. S do. do. .. | 7 | 8 | 4in. S do. do. .. | 13 | 6 |

### BRASS TRAP SCREWS.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1½in. .. .. .. | 1 | 3 | 2½in. .. .. .. | 3 | 6 |
| 2in. .. .. .. .. | 2 | 6 | 3in. .. .. .. | 3 | 10 |

### FULL WAY BRASS STOP COCKS, W. & S. BOARD.

FIXED.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ¾in., each .. .. .. | 4 | 9 | 1¼in. each .. .. | 15 | 0 |
| 1in. ,, .. .. .. | 8 | 0 | ¾in. Brass Cock Forges .. | 3 | 4 |
| 1in. Brass Cock Forges .. | 8 | 0 | | | |

BRASS TUBING, including all Fittings—Per foot run.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ⅝in. diameter .. .. .. .. .. .. .. .. | 0 | 8 |
| ½in. diam. .. .. .. .. .. .. .. .. | 0 | 7 |
| ⅜in. diam. .. .. .. .. .. .. .. .. | 0 | 6 |

### VENTILATORS.

| | | |
|---|---|---|
| Zig Zag Galv. Iron, 9ft. x 6ft., with gratings .. .. .. | 8 | 11 |
| 4in. Galv. Iron Tube, 7ft. lengths, with gratings .. .. | 14 | 4 |

### LEAD.

Sheets, 30 to 40 ft. long, by 7 feet wide.

| | | | |
|---|---|---|---|
| 3lbs per square foot | = | 1/20 inch. | Approximate Gauge, No. 18 |
| 4lbs. ,, | = | 1/15in. | ,, No. 16 |
| 5lbs. ,, | = | 1/12 | ,, No. 14 |
| 6lbs. ,, | = | 1/10in. | ,, No. 12 |
| 7lbs. ,, | = | 1/9in. | ,, No. 11 |
| 8lbs. ,, | = | ⅛in. | ,, No. 11 |

### LEAD REQUIRED TO CAULK P. AND S. PIPES.

| Interior Diameter of Pipe. Inches. | Length of Socket, Inside Measure Inches. | Lbs. per Joint. Weight of Lead per Joint. Lbs. | Depth of Lead in Inches. Inches. |
|---|---|---|---|
| 1½ | 2½ | 1¼ | 1⅜ |
| 2 | 3 | 1¾ | 1½ |
| 2½ | 3 | 2¼ | 1⅝ |
| 3 | 3 | 2¾ | 1⅝ |
| 4 | 4 | 4 | 1¾ |
| 5 | 4 | 5½ | 1⅞ |
| 6 | 4 | 7 | 2 |

**BATHS** (Hot and Cold).

| | £ | s. | d. |
|---|---|---|---|
| High pressure boilers, for kitchen range, to supply hot water, fixed, from .. .. .. .. .. £5 to | 7 | 0 | 0 |
| Hot and cold water cisterns to supply bath, lavatory, kitchen and wash house, from .. .. .. ..£6 to | 10 | 0 | 0 |
| Wash hand basin fitted with hot and cold water, exclusive of pipes, from .. .. .. .. .. 18/– to | 3 | 0 | 0 |
| Galvanized iron bath, 24 gauge, each .. .. .. .. | 1 | 5 | 0 |
| Copper shower and stop cock for same .. .. .. .. | 0 | 10 | 6 |
| Cold water tap and hot water tap, $\frac{3}{4}$", each .. .. .. | 0 | 7 | 6 |
| Marble Baths, full size, with brass connections for supply, waste, and overflow pipes .. .. .. .. ..| 12 | 0 | 0 |

WROUGHT-IRON PIPES, PER FOOT.
Thickness of Iron.

| Bore Ins. | in. 1-16 lb. | in. $\frac{1}{8}$ lb. | in. 3-16 lb. | in. $\frac{1}{4}$ lb. | in. 5-16 lb. |
|---|---|---|---|---|---|
| $\frac{3}{8}$ | ·3 | ·7 | 1·1 | .. | .. |
| $\frac{1}{2}$ | ·4 | ·83 | 1·4 | 2·0 | .. |
| $\frac{5}{8}$ | ·46 | 1·1 | 1.6 | 2·3 | 3·1 |
| $\frac{3}{4}$ | ·51 | 1·2 | 1·9 | 2.6 | 3·5 |
| $\frac{7}{8}$ | ·6 | 1·3 | 2·1 | 2·9 | 3·9 |
| 1 | ·7 | 1.5 | 2·4 | 3·3 | 4 3 |
| $1\frac{1}{4}$ | ·87 | 1·8 | 2·9 | 3·9 | 5·2 |
| $1\frac{1}{2}$ | 1·0 | 2·1 | 3·3 | 4·7 | 5·9 |
| $1\frac{3}{4}$ | 1·2 | 2·5 | 3·8 | 5·3 | 6·8 |
| 2 | 1·4 | 2·8 | 4·3 | 5·9 | 7·6 |
| $2\frac{1}{2}$ | 1·7 | 3·5 | 5·3 | 7·3 | 9·3 |
| 3 | 2·03 | 4·1 | 6·3 | 8·6 | 10·9 |
| $3\frac{1}{2}$ | 2·34 | 4·7 | 7·3 | 9·8 | 12·5 |

COPPER PIPE.
The Weight of a Foot in length.

| Thickness. Bore | in. $\frac{1}{16}$ lb. | in. $\frac{1}{8}$ lb. | in. $\frac{3}{16}$ lb. | in. $\frac{1}{4}$ lb. |
|---|---|---|---|---|
| $\frac{1}{2}$ in. | 0·42 | ·94 | 1·60 | 2·27 |
| $\frac{5}{8}$ | 0·52 | 1·14 | 1·79 | 2·65 |
| $\frac{3}{4}$ | 0·62 | 1·33 | 2·17 | 3·02 |
| $\frac{1}{2}$ | 0·71 | 1·51 | 2·45 | 3·40 |
| 1 | 0·80 | 1·69 | 2·73 | 3·77 |
| $1\frac{1}{4}$ | 1·00 | 2·08 | 3·29 | 4·50 |
| $1\frac{1}{2}$ | 1·15 | 2·42 | 3·85 | 5·30 |
| $1\frac{3}{4}$ | 1·40 | 2·87 | 4·48 | 6·08 |
| 2 | 1·55 | 3·21 | 5·00 | 6·80 |
| $2\frac{1}{4}$ | 1·74 | 3·58 | 5·56 | 7·55 |
| $2\frac{1}{2}$ | 1·94 | 3·97 | 6·14 | 8·31 |
| $2\frac{3}{4}$ | 2·09 | 4·34 | 6·73 | 9·12 |
| 3 | 2·27 | 4·78 | 7·30 | 9·82 |

## Copper Boilers.

*Diagonal length from top of rim to the bottom edge.*

| Inches. | Gallons. | lbs. | Inches. | Gallons. | lbs. |
|---|---|---|---|---|---|
| $9\frac{3}{4}$ | 1 | $1\frac{1}{2}$ | 21 | 10 | 15 |
| $12\frac{1}{2}$ | 2 | 3 | $21\frac{1}{2}$ | 11 | $16\frac{1}{2}$ |
| 14 | 3 | $4\frac{1}{2}$ | 22 | 12 | 18 |
| $15\frac{1}{2}$ | 4 | 6 | $22\frac{1}{2}$ | 13 | $19\frac{1}{2}$ |
| $16\frac{1}{2}$ | 5 | $7\frac{1}{2}$ | $23\frac{1}{2}$ | 14 | 21 |
| $17\frac{1}{2}$ | 6 | 9 | 24 | 15 | $22\frac{1}{2}$ |
| $18\frac{1}{2}$ | 7 | $10\frac{1}{2}$ | $24\frac{1}{2}$ | 16 | 24 |
| $19\frac{1}{2}$ | 8 | 12 | 25 | 17 | $25\frac{1}{2}$ |
| $20\frac{1}{4}$ | 9 | $13\frac{1}{2}$ | $25\frac{1}{2}$ | 18 | 27 |

*Mem.*—It will be seen that the weight is $1\frac{1}{2}$ lbs. to the gallon, and this rule holds good for larger sizes. The present price in Melbourne, Sydney, &c., is about 16d. per lb.

**Tank System of Hot-Water Supply.**

| Fire Grate. | Type of Boiler Used. | Tank Required. | Delivery and Return Pipes. | Net Number Outlets. |
|---|---|---|---|---|
| Width Ins. | | Gallons. | Inch. | |
| 9 | Saddle | 22 | 1 | 2 |
| 9 | Boot | 28 | 1 | 3 |
| 10 | Saddle | 25 | 1 | 3 |
| 10 | Boot | 32 | 1 | 4 |
| 11 | Saddle | 30 | 1 | 4 |
| 11 | Boot | 40 | 1 or 1¼ | 5 |
| 12 | Saddle | 35 | 1 | 4 |
| 12 | Boot | 45 | 1¼ | 5 |
| 14 | Saddle | 42 | 1¼ | 5 |
| 14 | Boot | 55 | 1¼ | 6 |

**Cylinder System of Hot Water Supply.**

| Fire Grate. | Type of Boiler Used. | Cylinder Required. | Delivery and Return Pipes. | Number of Outlets. |
|---|---|---|---|---|
| Width Ins. | | Gallons | Inch | |
| 9 | Saddle | 22 | 1 | 2 |
| 9 | Boot | 28 | 1¼ | 3 |
| 10 | Saddle | 25 | 1 | 3 |
| 10 | Boot | 32 | 1¼ | 4 |
| 11 | Saddle | 30 | 1¼ | 4 |
| 11 | Boot | 40 | 1¼ | 5 |
| 12 | Saddle | 35 | 1 | 4 |
| 12 | Boot | 45 | 1½ | 5 |
| 14 | Saddle | 42 | 1½ | 5 |
| 14 | Boot | 55 | 1½ | 6 |

**The Combined System** is the cylinder and the tank systems in one. The combination is claimed to overcome dangerous conditions which might arise if the tank system was emptied when the water supply failed. It also produces a better flow at the high taps. The reverse is sometimes associated with the cylinder system when used alone.

GUN METAL FITTINGS.—Each.

| | Ts. | Elbows | Sockets. | Unions. | Nipples. |
|---|---|---|---|---|---|
| ½″ pipe .. | 0 10 | 0 7 | 0 5 | 2 0 | 0 7 |
| ¾″ ,, .. | 1 3 | 1 0 | 0 9 | 2 3 | 0 10 |
| 1″ ,, .. | 2 2 | 1 10 | 1 4 | 3 3 | 1 2 |
| 1¼″ ,, .. | 2 4 | 2 2 | 2 0 | 4 9 | 2 0 |

### Brass Cocks, &c. for Water or Steam.

| *Exclusive of Fixing.* *Each.* | ½in. | ¾in. | 1in. | 1¼in. | 1½in. |
|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. |
| Square way, bib, or stop cocks | 4 0 | 6 0 | 8 6 | 15 0 | 18 0 |
| Round way cocks .. .. | 5 0 | 7 6 | 10 0 | 18 0 | 22 0 |
| Range boiler cocks with screw bottom .. .. .. | 5 6 | 7 6 | 10 6 | — | — |
| High pressure bib or stop cocks | 4 6 | 6 0 | 9 6 | 25 0 | 35 0 |
| Brass tubing, at 1/9 per lb. .. | 0 9 | 1 0 | 1 4 | 1 8 | 2 0 |

N.B.—If for more than one item deduct 15 per cent. from the above prices.

### MATERIAL ONLY.

Gal. Wrought Iron Steam Pipes and Fittings, 1st quality, 60 per cent. off Trade List.

Gal. Wrght. Iron Hot Water Tanks, 3/16-in. thick plate—
20 gallons capacity, £5 ; 30, £7/10/– ; 50, £10 ; 100, £17/10/–.

Gal. Plate Iron Circulating Cylinders—
20 gallons capacity, £6 ; 30, £7/10/– ; 40, £9 ; 50, £11/10/–

Pat. Steam Traps, " Heintz "—
½in. pipes, £1/9/– ; §in., £1/17/– ; ¾in., £2/5/– ; 1in., £2/12/–.

### Labour only.

Reckon from 4d. to 8d. per foot run for fixing pipes.
Fixing Cylinder tanks on brackets, &c., to be added.

**Hannam's Patent Bath-water Heaters**, unfixed—
For **wood fuel.**—A handful of chips will heat the water to any temperature as it runs through the machine—

| | | | | | |
|---|---|---|---|---|---|
| No. 1, | 1 gall. per minute, | iron | £2 | Copper, | £4 |
| No. 2, | 2 galls. | do. | do. | £3 | ,, £5 |
| No. 3, | 3 galls. | do. | do. | £5 | ,, £7/10/– |

**Hannam's P.W. Heater,** for Gas ; suitable for bath or kitchen. All copper, high pressure, £5 ; low pressure, £6.
The high pressure machine will not work at less than 25lbs. water pressure. *See* Index LIGHTING, HEATING, &C.

### FLEXIBLE METALLIC TUBING.

For Gas, Water, Steam or Oil.

#### Bronze No. 2.

| Size.. .. .. .. | ½″ | ¾″ | 1″ | 1¼″ | 1½″ |
|---|---|---|---|---|---|
| Price, per foot .. .. | 4/– | 5/8 | 7/– | 8/6 | 11/3 |
| Connections for same, ea. | 4/6 | 9/6 | 11/3 | 13/– | 13/9 |

#### Steel No. 2.

| Size .. .. .. | ⅜″ | ½″ | ⅝″ | ¾″ | 1″ | 1¼″ | 1½″ |
|---|---|---|---|---|---|---|---|
| Price, per foot .. | 1/3 | 1/6 | 2/– | 2/3 | 2/6 | 3/6 | 4/6 |
| Connect. for same, ea. .. | 2/9 | 3/3 | 4/3 | 5/3 | 6/9 | 10/6 | 13/9 |

## INDIA RUBBER.

**Corrugated Rubber Matting,** for treads of stairs, ⅛in. thick, per sq. ft. 2/–
Perforated Door Mats, ⅜in. thick, per sq. ft., 2/–.
Lettering on Mats, extra, per letter, 6d.
Rob Roy Canvas Fire Hose, 2½in., per lin. ft., 1/3.
**Draught Tubing,** for air-tight chambers, with canvas flange for attachment—3/16in., 2/– ; ¼in., 2/6 ; 5/16in., 3/6 ; ⅜in., 4/6.
**Gum Knee Boots,** for wet sinking, from 20/– per pair.

### RUBBER HOSE INTERNAL MEASUREMENT.

Note.—Hose Measurements are internal diameter.

| Inches | ¾ | 1 | 1¼ | 1½ | 2 | 2½ |
|---|---|---|---|---|---|---|
| Seamless Canvas Hose, per yd. | 6d. | 7d. | 8d. | 10d. | 1/– | 1/3 |
| Indiarubber Delivery Hose, 3 ply, per ft. | — | — | 1/3 | 1/6 | 2/– | 2/3 |
| Ditto Suction Ditto | 1/2 | 1/4 | 1/8 | 2/– | 2/9 | 3/3 |
| Garden Hose— | | ¾in. | | | 1in. | |

| | Cut. ft. | 50ft. Coil. | Cut. ft. | 50ft. Coil. |
|---|---|---|---|---|
| Linen Covered, Genuine "Eureka" | 7½d. | 29/6 | 11d. | 41/6 |
| 3-ply Indiaubber Hose | 7½d. | 27/6 | — | — |
| Ditto, Armoured | 9d. | 36/– | — | — |
| 3-ply Indiarubber Delivery Hose (North British Rubber Co.'s) | 9½d. | 37/6 | — | — |
| Ditto, Armoured | 11d. | 43/9 | — | — |
| Ditto, Heavy | 10½d. | 41/6 | 1/1 | 50/– |
| Ditto, ditto, Armoured | 1/0½ | 50/– | 1/3 | 58/– |

**Steam Hose,** 5-ply, covered with tarred marline—½in., 2/– ; ¾in., 2/6 ; 1in., 3/– ; 1¼in., 3/6 ; 1½in., 4/– ; 2in., 5/6 ; 2½in., 6/9 per foot.

### TUBING FOR GAS.—Per foot.

| Internal diam. | ¼in. | ⅜in. | ½in. | ¾in. | 1in. | 1¼in. | 1½in. |
|---|---|---|---|---|---|---|---|
| Vulcanised | 5d. | 7d. | 8d. | 9d. | 10d. | 1s. 2d. | 1s. 4d. |

**Washers or joints** for gas and water pipes, per lb.—

| ¼in. thick | 3in. | 4in. | 5in. | 6in. | 8in. | 10in. | 12in. |
|---|---|---|---|---|---|---|---|
| Ditto, each | 4d. | 5d. | 6d. | 7d. | 10d. | 1s. 2d. | 1s. 4d. |

**Sheet Rubber,** from 1/10th to ½in. thick, and 3 or 4 feet wide, per lb., from 3/– to 5/–.

Vulcanised or mineralised India Rubber weighs from 6 to 9 lbs. per super. foot, 1 inch in thickness ; this diversity in the weight is owing to the quantity of sulphur incorporated, which varies according to the purpose for which it is applied.

**Bell-Hanging** with porcelain dado, levers, zinc tubing, No. 17 gauge copper wire, cranks and bell, complete per pull, from 20/– to 25/–.

**Diving Apparatus** complete in the Australian cities from £135 to £175

# SMITH.

**Test for Iron.**—A soft tough iron, if broken gradually, gives long silky fibres of leaden-grey hue, which twist together and cohere before breaking.

Badly refined iron gives a short blackish fibre on fracture, a very fine grain denotes hard, steely iron, likely to be cold-short.

A medium, even grain, with denser fibres, shows good iron.

Coarse grain, with bright crystallised fracture, or discoloured spots, denotes cold-short, brittle iron, which works easily when heated, and welds well.

Cracks on the edge of a bar are indications of hot-short iron.

Good iron is readily heated, is soft under the hammer, and throws out few sparks.

Iron remains bright if touched with nitric acid.

**Test for Steel.**—Good steel in its soft state has a curved fracture and a uniform grey lustre ; in its hard state a dull silvery uniform white.

Nitric acid will produce a black spot on steel ; the darker the spot the harder the steel.

Cracks, threads, or sparkling particles denote bad quality.

Good steel will not bear a white heat without falling to pieces, and will crumble under the hammer at a bright red heat, while at a middling heat it may be drawn out, under the hammer, to a fine point. Care should be taken that before attempting to draw it out to a point the fracture is not concave, and should it be so, the end should be filed to an obtuse point before operating. Steel should be drawn out to a fine point and plunged into cold water ; the fractured point should scratch glass.

To test its toughness, place a fragment on a block of cast-iron ; if good, it may be driven by the blow of a hammer into the cast-iron ; if poor, it will crush under the blow.

**Testing Girders.**—The easiest and cheapest way to test girders in pairs is to dig a trench longer and wider than the girders, which are laid in the trench with sufficient space between them to insert an hydraulic lift in the centre, the ends being easily fixed with wooden blocks ; by pumping to exactly the pressure required each girder is fully tested.

**Approximate Weight of Castings** from the Pattern.—The weight of pattern in lbs. multiplied by *constants* given, will give the weight of casting in lbs. for the following metals :—

| | C. Iron. | Zinc. | Brass. | Copper. | G. Metal | Lead |
|---|---|---|---|---|---|---|
| White Pine or Deal, dry | 15 | 15 | 18 | 19 | 19 | 25 |
| Yellow Pine, dried .. | 14 | 14 | 17.5 | 18 | 18 | 24 |
| Clay dried (model) .. | 4. | 3.8 | 4.4 | 4.6 | 4.6 | 6 |
| Plaster of Paris, ditto.. | 3.3 | 3.2 | 3.7 | 3.8 | 3.8 | 5 |

TABLE exhibiting the weight of a lineal foot of square and round Bar Iron.

| Side and diam. in inches. | Square in lbs. | Round in lbs. | Side and diam. in inches. | Square in lbs | Round in lbs. | Side and diam. in inches. | Square in lbs. | Round in lbs. |
|---|---|---|---|---|---|---|---|---|
| 1/4 | .21 | .16 | 1 1/16 | 7.52 | 5.91 | 3 1/16 | 40.92 | 32.17 |
| 5/16 | .33 | .26 | 1 1/8 | 8.83 | 6.93 | 3 1/8 | 43.89 | 34.47 |
| 3/8 | .47 | .37 | 1 3/16 | 10.23 | 8.04 | 3 3/16 | 46.97 | 36.90 |
| 7/16 | .64 | .50 | 1 1/4 | 11.74 | 9.22 | 3 1/4 | 50.15 | 39.39 |
| 1/2 | .84 | .66 | 2 | 13.36 | 10.50 | 4 | 53.44 | 41.98 |
| 9/16 | 1 06 | .83 | 2 1/16 | 15.08 | 11.85 | 4 1/16 | 56.83 | 44.64 |
| 5/8 | 1.31 | 1.03 | 2 1/8 | 16.91 | 13.28 | 4 1/8 | 60.33 | 47.39 |
| 11/16 | 1.58 | 1.24 | 2 3/16 | 18.84 | 14.80 | 4 3/16 | 63.93 | 50.21 |
| 3/4 | 1.88 | 1.48 | 2 1/4 | 20.88 | 16.40 | 4 1/4 | 67.64 | 53.13 |
| 13/16 | 2.21 | 1.73 | 2 5/16 | 23.12 | 18.15 | 4 5/16 | 71.45 | 56.11 |
| 7/8 | 2.56 | 2.01 | 2 3/8 | 25.26 | 19.84 | 4 3/8 | 75.36 | 59.19 |
| 15/16 | 2.94 | 2.31 | 2 7/16 | 27.61 | 21.68 | 5 | 83.51 | 65.59 |
| 1 | 3.34 | 2.62 | 3 | 30.07 | 23.65 | 5 1/4 | 92.46 | 72.62 |
| 1 1/16 | 4.23 | 3.32 | 3 1/16 | 32.62 | 25.62 | 5 1/2 | 101.04 | 79.37 |
| 1 1/8 | 5.22 | 4 10 | 3 1/8 | 35 28 | 27.71 | 5 3/4 | 110.43 | 86.73 |
| 1 3/16 | 6.32 | 4.96 | 3 3/16 | 38.05 | 29.88 | 6 | 120.24 | 94.61 |

WEIGHT OF BOLT HEADS AND NUTS IN LBS.

| Diam. of Bolt in ins. | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 | 2 1/2 | 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weight of hex. nut and head | .017 | .057 | .128 | .267 | .43 | .73 | 1.10 | 2.14 | 3.78 | 5.6 | 8.75 | 17. | 28.8 |
| Do. square nut & head | .021 | .069 | .164 | .32 | .55 | .88 | 1.31 | 2.56 | 4.42 | 7.2 | 10.5 | 21. | 36.4 |

## CAST IRON.

Exclusive of Patterns and Fixing, per cwt.

| | £ | s. | d. |
|---|---|---|---|
| Ornamental air and light ventilators from 2′ x 6″ to 3′ x 12″ under windows, &c., for lighting basements, &c. | 0 | 17 | 0 |
| Cast-iron egg-shaped sewers, 1¼″ thick | 0 | 18 | 0 |
| Ditto, cap to engine-house or factory chimney in four sections, to be bolted together | 20s. to | 1 | 4 | 0 |
| **Hollow columns,** with caps and bases | 12s. to | 0 | 16 | 0 |
| Water or gas pipes with flange or faucet ends, in small quantities | 12s. to | 0 | 14 | 0 |
| **Furnace bars, sewer gates,** and area gratings | 14s. to | 0 | 16 | 0 |
| Furnace doors and frames, complete | 18s. to | 1 | 2 | 0 |
| Cast-iron plates for floors, 3/16″ to 5/16″ | 12s. to | 0 | 16 | 0 |
| Cast-iron curved girders, best iron | 16s. to | 0 | 18 | 0 |
| Ditto do. do. bolted ends | | 1 | 4 | 0 |
| **Roof or Bridge castings,** viz., heads, shoes, coupling, &c. | 20s. to | 1 | 5 | 0 |
| Cast-iron steps and risers to geometrical steps, the riser ornamental, and the treads grooved | 30s. to | 2 | 0 | 0 |
| Ditto for N.S. Wales Government, with parabolic steps, arbitrary buttons on treads, &c. | 40s. to | 3 | 0 | 0 |

### COLUMNS, BALUSTERS, BRACKETS.

| | | | | |
|---|---|---|---|---|
| **Verandah columns,** plain or ornamental, 7 to 9ft. long, 3 x 3½ diam., fixed, each | 40s. to | 2 | 10 | 0 |
| Ditto, 4 x 4¾ diam., 9 to 12ft. long do. | 50s. to | 3 | 0 | 0 |
| Brackets, ornamental, 21 to 30 inch sides | 2s. 6d. to | 1 | 0 | 0 |
| Balusters, ornamental, for staircases | 3s. 6d. to | 0 | 9 | 0 |
| Newels, ornamental, 4 to 8ins. diam. | 10s. to | 1 | 15 | 0 |
| Finials, from 2ft. to 7ft. high | 20s. to | 3 | 16 | 0 |
| Palisade or gate bars, average 4ft. high, from | 2s 6d. to | 0 | 3 | 6 |
| Dog bars to match, half price. | | | | |
| Galvanising cast-iron, extra, per cwt. | 25s. to | 1 | 7 | 0 |

**Shrinkage of Casting** in a foot. Pipes, ⅛in. Zinc and lead per foot, 5/16in. ; Copper, per foot, 3/16 in. ; Tin, ¼inch.

Girders and Beams ⅛inch in 15 inches ; Brass, ⅛in. in 10 inches.

### BALCONY PANELS, CRESTINGS, FRIEZES.

Per Lineal Foot—Fixed.

| | | | | |
|---|---|---|---|---|
| Balcony panels, rich pattern, fitted with wrought iron top rail and standards, fixed complete | 6s. to | 9 | 0 |
| Ditto, plain Gothic, or other patterns | 5s. to | 7 | 0 |
| Ditto, very richly ornamented | 7s. to | 10 | 0 |
| Cresting or ridging, various patterns | 2s. to | 4 | 0 |
| Window guards, from 18 to 30ins. high | 5s. to | 7 | 0 |
| Friezes for verandahs, balconies, &c. | 1/3 to | 3 | 0 |

### Weight of Cast Iron Pipes.

Note.—The inch pipes are 3½ feet long, the 1½ inch 4½ feet long, the 2 and 2½ inch are 6 feet long, and the other sizes 9 feet long.

| Bore. | Thick. | Weight. | Bore. | Thick. | Weight. | Bore. | Thick. | Weight. |
|---|---|---|---|---|---|---|---|---|
| In. | In. | cwt. qrs. lbs. | In. | In. | cwt. qrs. lbs. | In. | In. | cwt. qrs. lbs. |
| 1 | ¼ | 0 0 12 | 5½ | ½ | 2 2 0 | 12 | ¾ | 7 3 20 |
| | ⅜ | 0 0 21 | | ⅝ | 3 0 18 | | 1 | 10 3 0 |
| 1½ | ¼ | 0 0 21 | | ¾ | 3 3 7 | 13 | ¾ | 8 2 7 |
| | ⅜ | 0 1 4 | 6 | ½ | 2 2 21 | | 1 | 11 2 12 |
| 2 | ¼ | 0 1 8 | | ⅝ | 3 1 17 | 14 | ⅝ | 7 2 16 |
| | ⅜ | 0 2 0 | | ¾ | 4 0 16 | | ¾ | 9 1 0 |
| 2½ | ⅜ | 0 2 10 | | 1 | 5 2 20 | | 1 | 12 1 14 |
| | ½ | 0 3 10 | 7 | ½ | 3 0 7 | 15 | ⅝ | 9 3 7 |
| 3 | ⅜ | 1 0 6 | | ⅝ | 3 3 20 | | 1 | 13 0 26 |
| | ½ | 1 1 12 | | ¾ | 4 3 5 | | 1¼ | 10 3 5 |
| | ⅝ | 1 3 6 | | 1 | 6 2 4 | 16 | ¾ | 10 1 20 |
| 3½ | ⅜ | 1 0 21 | 8 | ⅝ | 4 1 25 | | 1 | 14 0 8 |
| | ½ | 1 2 14 | | ¾ | 5 1 18 | | 1¼ | 17 3 14 |
| | ⅝ | 2 0 8 | | 1 | 7 1 16 | 18 | 1 | 15 2 24 |
| 4 | ½ | 1 3 12 | 9 | ⅝ | 5 0 4 | | 1⅛ | 17 2 26 |
| | ⅝ | 2 1 12 | | ¾ | 6 0 2 | | 1¼ | 20 0 2 |
| | ¾ | 2 3 21 | | 1 | 8 0 26 | 20 | 1 | 17 1 15 |
| 4½ | ½ | 2 0 4 | 10 | ⅝ | 5 4 26 | | 1¼ | 21 3 24 |
| | ⅝ | 2 2 14 | | ¾ | 6 2 14 | 22 | 1 | 18 3 18 |
| | ¾ | 3 0 21 | | 1 | 9 0 8 | | 1¼ | 24 0 23 |
| 5 | ½ | 2 1 10 | 11 | ⅝ | 6 0 11 | 24 | 1 | 20 3 5 |
| | ⅝ | 2 3 17 | | ¾ | 7 1 7 | | 1⅛ | 23 2 4 |
| | ¾ | 3 1 14 | | 1 | 9 3 20 | | 1¼ | 26 1 10 |

**Jointing Pipes.**—Lead and gasket or fine hemp rope and labour, for joints of socket pipes.

| Diam. inches | 4 | 6 | 9 | 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lead, lbs. | 6 | 9 | 14 | 21 | 29 | 38 | 48 | 59 | 70 | 82 | 94 |
| Gasket, pence | 4 | 6 | 8 | 10 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| Labour, pence | 8 | 12 | 16 | 21 | 30 | 36 | 48 | 60 | 72 | 84 | 96 |

Two rings or coils of gasket are generally used, about 1½ inches wide together. It is necessary that the pipes should be dry and the mouth of the clay ring oiled to prevent the explosive effect of the steam generated by the sudden contact with the melted lead. Clay only can be used for pipes up to 18ins. diam., a leather strap or rope will hold the clay for 24in. pipes; above this size it is expedient to use iron collars or straps in semi-circles screwed together with bolts at bottom and top, these fit closely to the required joint and are lightly covered with clay. The large pipes can be run with one melting of lead, if heated to a blue tinge; after the joint is run, it is caulked. The cost of laying the pipes up to 9in. diam. would be about 20 per cent. more than for earthenware pipes (see Index), above this size as follows:—

**Labour** in carting one mile, lowering and levelling pipes and adjusting for joints.

| Diam. inches .. .. | 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 |
|---|---|---|---|---|---|---|---|---|
| Pence, per lineal foot .. | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |

The cost of excavation in hard clay or light shale to a depth of three feet including recesses for jointing, refilling 9in -in. layers, watering and ramming per lineal foot, will be about 50 per cent. more than last item for lowering, laying, &c.

Flange pipes are jointed with a collar of 3 or 4lb. lead, bedded in soft red lead putty and screwed together with bolts, 3 to 6 inches apart.

**Ends of Pipes.**—The two flanges of a flange pipe, or the faucet end of a socket pipe, are equal in weight to from 8 to 11ins. of the pipe.

WEIGHT OF A LINEAL FOOT OF CAST-IRON PIPES IN LBS.

| Bore inches. | Thickness of Metal. | Weight lbs. | Bore inches. | Thickness of Metal. | Weight lbs. | Bore inches. | Thickness of Metal. | Weight lbs. |
|---|---|---|---|---|---|---|---|---|
| 3 | 3/8 | 12·4 | 11 | 1/2 | 56·4 | 22 | 1 1/8 | 254·9 |
| | 1/2 | 17·1 | | 5/8 | 71·0 | | 1 1/4 | 284·8 |
| | 5/8 | 22·2 | | 3/4 | 86·4 | 24 | 1 | 245·0 |
| 4 | 3/8 | 16·1 | | 7/8 | 101·8 | | 1 1/8 | 276·9 |
| | 1/2 | 22·1 | 12 | 5/8 | 77·3 | | 1 1/4 | 319·3 |
| | 5/8 | 28·3 | | 3/4 | 93·7 | 27 | 1 | 276·0 |
| 5 | 3/8 | 19·8 | | 7/8 | 110·4 | | 1 1/8 | 311·0 |
| | 1/2 | 26·9 | | 1 | 127·4 | | 1 1/4 | 348·0 |
| | 5/8 | 34·4 | 14 | 5/8 | 89·6 | | 1 3/8 | 384·0 |
| 6 | 3/8 | 23·4 | | 3/4 | 108·4 | 30 | 1 | 305·0 |
| | 1/2 | 31·9 | | 7/8 | 127·5 | | 1 1/8 | 345·0 |
| | 5/8 | 40·6 | | 1 | 147·0 | | 1 1/4 | 384·0 |
| | 3/4 | 49·7 | 15 | 5/8 | 115·7 | | 1 3/8 | 424·0 |
| 7 | 3/8 | 27·1 | | 7/8 | 136·1 | 33 | 1 | 335·0 |
| | 1/2 | 36·8 | | 1 | 156·8 | | 1 1/8 | 378·0 |
| | 5/8 | 46·7 | | 1 1/8 | 177·7 | | 1 1/4 | 421·0 |
| | 3/4 | 56·8 | 16 | 3/4 | 123·1 | | 1 3/8 | 465·0 |
| 8 | 3/8 | 30·8 | | 7/8 | 144·7 | 36 | 1 1/8 | 411·0 |
| | 1/2 | 41·6 | | 1 | 166·6 | | 1 1/4 | 458·0 |
| | 5/8 | 52·8 | | 1 1/8 | 188·7 | | 1 3/8 | 506·0 |
| | 3/4 | 64·3 | 18 | 3/4 | 137·9 | | 1 1/2 | 554·0 |
| 9 | 3/8 | 34·4 | | 7/8 | 161·8 | 42 | 1 1/8 | 478·0 |
| | 1/2 | 46·6 | | 1 | 186·2 | | 1 1/4 | 532·0 |
| | 5/8 | 58·9 | | 1 1/8 | 210·8 | | 1 3/8 | 588·0 |
| | 3/4 | 71·7 | 20 | 7/8 | 178·9 | | 1 1/2 | 644·0 |
| 10 | 1/2 | 51·4 | | 1 | 205·8 | 48 | 1 1/8 | 544·0 |
| | 5/8 | 65·1 | | 1 1/8 | 232·9 | | 1 1/4 | 605·0 |
| | 3/4 | 79·0 | | 1 1/4 | 260·3 | | 1 3/8 | 669·0 |
| | 7/8 | 93·3 | 22 | 1 | 225·4 | | 1 1/2 | 733·0 |

## WEIGHT OF 100 BOLTS AND NUTS.

In Lbs. and Decimals.

Length of Bolt in inches.

| Heads & Nuts. | 2 | 2½ | 3 | 3½ | 4 | 4½ | 5 | 5½ | 6 | 6½ | 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ¼″ dia. Hexagon | 4.36 | 5. | 5.7 | 6.3 | 7. | 7.7 | 8.36 | 9. | 9.7 | 10.3 | 11. |
| ¼″ diam. Square | 4.7 | 5.4 | 6.1 | 6.7 | 7.4 | 8.1 | 8.7 | 9.4 | 10.1 | 10.7 | 11.4 |
| ⅜″ diam. Square | 11.8 | 13.4 | 14.9 | 16.4 | 18. | 19.6 | 21.1 | 22.6 | 24.2 | 25.7 | 27.2 |
| ⅜″ diam. Square | 13. | 14.6 | 16.1 | 17.6 | 19.2 | 20.8 | 22.3 | 23.8 | 25.4 | 26.9 | 28.4 |
| ½″ dia. Hexagon | 23.8 | 26.5 | 29.3 | 32. | 34.7 | 37.6 | 40.2 | 43. | 45.8 | 48.5 | 51.2 |
| ½″ diam. Square | 27.4 | 30.1 | 32.9 | 35.6 | 38.3 | 41.2 | 43.8 | 46.6 | 49.8 | 52.1 | 54.8 |
| ⅝″ dia. Hexagon | 43.8 | 48.1 | 52.4 | 56.7 | 61. | 65.4 | 69.6 | 73.9 | 78.2 | 82.4 | 86.7 |
| ⅝″ diam. Square | 49.1 | 53.4 | 57.7 | 62. | 66.3 | 70.7 | 74.9 | 79.2 | 83.5 | 87.7 | 92. |
| ¾″ dia. Hexagon | 67.6 | 73. | 80. | 86.1 | 92.3 | 98. | 104. | 111. | 117. | 123. | 129. |
| ¾″ diam. Square | 79.6 | 85. | 92. | 98.1 | 104. | 110. | 116. | 122. | 129. | 135. | 141. |
| ⅞″ dia. Hexagon | 106. | 114. | 123. | 131. | 140. | 148. | 156. | 165. | 173. | 182. | 194. |
| ⅞″ diam. Square | 121. | 129. | 138. | 146. | 155. | 163. | 171. | 180. | 188. | 197. | 205. |
| 1″ dia. Hexagon | 153. | 164. | 175. | 185. | 196. | 208. | 218. | 229. | 240. | 251. | 262. |
| 1″ dia. .. .. | 174. | 185. | 196. | 206. | 217. | 229. | 239. | 250. | 261. | 272. | 283. |

## WEIGHT OF 100 BOLTS AND NUTS (Continued).

In Lbs. and Decimals.

Length of Bolt in Inches.

| | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1¼″ dia. Hexagon | 12.3 | 13.7 | 15. | 16.3 | 17.7 | 19. | 20.3 | 21.7 | 23. | 24.3 | 25.7 |
| 1¼″ diam. Square | 12.7 | 14.1 | 15.4 | 16.7 | 18.1 | 19.4 | 20.7 | 22.1 | 24.4 | 24.7 | 26.1 |
| 1⅜″ dia. Hexagon | 30.3 | 33.4 | 36.5 | 39.5 | 42.7 | 45.7 | 48.9 | 51.9 | 55. | 58.1 | 81.2 |
| 1⅜″ diam. Square | 31.5 | 34.6 | 37.7 | 40.7 | 43.9 | 46.9 | 50. | 53.1 | 56.2 | 59.3 | 82.4 |
| 1½″ dia. Hexagon | 56.7 | 62.3 | 67.7 | 73.1 | 78.8 | 84.1 | 89.7 | 95.3 | 100. | 106. | 111. |
| 1½″ dia. Square | 60.3 | 65.9 | 71.3 | 76.7 | 82.4 | 87.7 | 93.3 | 99. | 104. | 110. | 115. |
| 1⅝″ dia. Hexagon | 95.3 | 104. | 112. | 121. | 129. | 138. | 146. | 155. | 164. | 172. | 183. |
| 1⅝″ dia. Square | 100. | 109. | 117. | 126. | 135. | 143. | 152. | 161. | 169. | 178. | 188. |
| 1¾″ dia. Hexagon | 141. | 154. | 166. | 178. | 191. | 203. | 215. | 228. | 240. | 252. | 265. |
| 1¾″ dia. Square | 153. | 166. | 178. | 190. | 203. | 215. | 227. | 230. | 252. | 264. | 277. |
| 1⅞″ dia. Hexagon | 211. | 227. | 240. | 257. | 278. | 291. | 307. | 324. | 340. | 358. | 379. |
| 1⅞″ dia. Square | 222. | 238. | 255. | 272. | 289. | 306. | 322. | 339. | 355. | 373. | 394. |
| 1″ dia. Hexagon | 283. | 305. | 326. | 348. | 370. | 391. | 413. | 435. | 456. | 478. | 500. |
| 1″ dia. Square | 304. | 326. | 357. | 369. | 391. | 412. | 434. | 456. | 477. | 499. | 521. |

For over 18 inches long, add for every inch, per gross (or 144 bolts), as under :—

| Bolts, inches diam. | ⅜ | ½ | ⅝ | ¾ | ⅞ | 1 |
|---|---|---|---|---|---|---|
| Lbs. .. .. | 5 | 8 | 12 | 18 | 24 | 32 |

## WEIGHT OF

TABLE of the weight of a lineal foot of flat Bar Iron, in lbs.

| Breadth in inches. | Thickness in parts of an inch. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ¼ | 5/16 | ⅜ | 7/16 | ½ | 5/8 | ¾ | ⅞ | 1 |
| 1 | ·84 | 1 04 | 1·25 | 1·46 | 1·67 | 2·09 | 2·51 | 2·92 | 3·34 |
| 1⅛ | ·94 | 1·17 | 1·41 | 1·64 | 1 88 | 2·35 | 2·82 | 3·29 | 3 76 |
| 1¼ | 1·04 | 1·31 | 1·57 | 1·83 | 2·09 | 2·61 | 3·13 | 3·65 | 4 18 |
| 1⅜ | 1·15 | 1·44 | 1·72 | 2·01 | 2 30 | 2·87 | 3·44 | 4 02 | 4·59 |
| 1½ | 1·25 | 1·57 | 1 88 | 2·19 | 2·50 | 3·13 | 3·76 | 4·38 | 5·01 |
| 1⅝ | 1·36 | 1 70 | 2·04 | 2·37 | 2·72 | 3·39 | 4·07 | 4·75 | 5·43 |
| 1¾ | 1·46 | 1·83 | 2 19 | 2·56 | 2 92 | 3·65 | 4 38 | 5 11 | 5 85 |
| 1⅞ | 1 57 | 1·96 | 2 35 | 2·74 | 3·13 | 3·91 | 4 70 | 5·48 | 6 26 |
| 2 | 1·67 | 2·09 | 2·51 | 2 92 | 3·34 | 4·18 | 5·01 | 5·85 | 6·68 |
| 2¼ | 1·88 | 2 35 | 2·82 | 3·29 | 3·76 | 4 70 | 5·64 | 6·58 | 7·52 |
| 2½ | 2·09 | 2 61 | 3·13 | 3·65 | 4·18 | 5·22 | 6·26 | 7·31 | 8 35 |
| 2¾ | 2 30 | 2·87 | 3·44 | 4·02 | 4 59 | 5·74 | 6·89 | 8 04 | 9·19 |
| 3 | 2·51 | 3·13 | 3 76 | 4·38 | 5·01 | 6·26 | 7·52 | 8·77 | 10·02 |
| 3¼ | 2 72 | 3·39 | 4·07 | 4 75 | 5·43 | 6 78 | 8·14 | 9·50 | 10·86 |
| 3½ | 2·92 | 3·65 | 4·38 | 5·11 | 5·85 | 7·31 | 8·77 | 10·23 | 11·69 |
| 3¾ | 3 13 | 3·91 | 4·70 | 5·48 | 6·26 | 7 83 | 9·39 | 10 96 | 12·53 |
| 4 | 3 34 | 4·18 | 5 01 | 5 85 | 6·68 | 8 35 | 10·02 | 11 69 | 13 36 |
| 4¼ | 3·55 | 4·44 | 5 32 | 6 21 | 7·10 | 8·87 | 10 65 | 12·42 | 14·20 |
| 4½ | 3·76 | 4·70 | 5·64 | 6·58 | 7·52 | 9 39 | 11 27 | 13 15 | 15·03 |
| 4¾ | 3 97 | 4·96 | 5·95 | 6 94 | 7·93 | 9 92 | 11·90 | 13·88 | 15 86 |
| 5 | 4 18 | 5·22 | 6·26 | 7·31 | 8·35 | 10·44 | 12·53 | 14·61 | 16·70 |
| 5¼ | 4 38 | 5·48 | 6·58 | 7·67 | 8·77 | 10·96 | 13·15 | 15·34 | 17 54 |
| 5½ | 4 59 | 5·74 | 6·89 | 8·04 | 9·19 | 11·48 | 13·78 | 16·07 | 18·37 |
| 5¾ | 4·80 | 6·00 | 7·20 | 8·40 | 9·60 | 12 00 | 14·40 | 16 80 | 19·20 |
| 6 | 5 01 | 6·26 | 7·52 | 8 77 | 10 02 | 12·52 | 15·03 | 17 54 | 20·04 |

**Casting Statues.**—As a sample of Colonial work I refer to the bronze statue of Mercury over the *Evening News* office in Sydney. The statue, including the globe, is about 10ft. high, weights 10 cwt., and cost £120 for sculptor and £90 for founder, including patterns and fixing.

**Plate Iron Tanks** cost about the same by weight as girders, with the addition of the cost of caulking, which is about equal to riveting. The sides of the plates should not butt as in girders, but should lap, and be double riveted, by which means much labour is saved, and the joints effectually caulked; this is almost impossible when the plates butt, even if the edges are shot or planed.

400 gal. tanks, square, from £3. Setting up to be added.

## WASHERS PER 100.

¼ inch .. .. .. 1¾ lbs.
⅜ inch .. .. .. 2½ lbs.
½ inch .. .. .. 4½ lbs.
⅝ inch .. .. .. 6⅝ lbs.
¾ inch .. .. .. 8½ lbs.

1 inch .. .. 10¾ lbs.
1⅛ inch .. .. 18¾ lbs.
1¼ inch .. .. 24 lbs.
1½ inch .. .. 30 lbs.

## WEIGHT OF STEEL JOISTS, AND SAFE CARRYING LOAD.

*Standard Sections, British.*

A—Depth of Joist. C—Thickness of web.
B—Width of Flange. D—Thickness of Flange.

| Dimensions in Inches and diameter. | | | | Weight per foot run. | Safe Load in Tons Distributed for Clear Spans of | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | lbs. | 6ft. | 10ft. | 12ft. | 16ft. | 20ft. | 30ft. |
| 3 | 1½ | .16 | .248 | 4.0 | 0.92 | 0.55 | 0.46 | — | — | — |
| 3 | 3 | .20 | .332 | 8.5 | 2.0 | 1.2 | 1.0 | — | — | — |
| 4 | 1¾ | .17 | .24 | 5.0 | 1.5 | 0.91 | 0.76 | — | — | — |
| 4 | 3 | .22 | .336 | 9.5 | 3.1 | 1.9 | 1.6 | — | — | — |
| 4¾ | 1¾ | .18 | .325 | 6.5 | 2.4 | 1.4 | 1.2 | — | — | — |
| 5 | 3 | .22 | .376 | 11.0 | 4.5 | 2.7 | 2.3 | 1.7 | — | — |
| 5 | 4½ | .29 | .448 | 18.0 | 7.6 | 4.5 | 3.8 | 2.8 | — | — |
| 6 | 3 | .26 | .348 | 12.0 | 5.6 | 3.4 | 2.8 | 2.1 | — | — |
| 6 | 4½ | .37 | .431 | 20.0 | 9.6 | 5.8 | 4.8 | 3.6 | — | — |
| 6 | 5 | .41 | .520 | 25.0 | 12.0 | 7.3 | 6.0 | 4.5 | — | — |
| 7 | 4 | .25 | .387 | 16.0 | 9.4 | 5.6 | 4.7 | 3.5 | 2.8 | — |
| 8 | 4 | .28 | .402 | 18.0 | 11.0 | 7.0 | 5.8 | 4.3 | 3.5 | — |
| 8 | 5 | .35 | .575 | 28.0 | 18.0 | 11.0 | 9.0 | 7.0 | 5.5 | — |
| 8 | 6 | .44 | .597 | 35.0 | 23.0 | 14.0 | 11.0 | 8.6 | 7.0 | — |
| 9 | 4 | .30 | .460 | 21.0 | 15.0 | 9.0 | 7.5 | 5.6 | 4.5 | |
| 9 | 7 | .55 | .924 | 58.0 | 42.0 | 25.0 | 21.0 | 16.0 | 12.0 | — |
| 10 | 5 | .36 | .552 | 30.0 | 24.0 | 14.0 | 12.0 | 9.0 | 7.2 | — |
| 10 | 6 | .40 | .736 | 42.0 | 35.0 | 21.0 | 17.0 | 13.0 | 10.0 | — |
| 10 | 8 | .60 | .970 | 70.0 | 53.0 | 34.0 | 28.0 | 21.0 | 17.0 | — |
| 12 | 5 | .35 | .550 | 32.0 | 30.0 | 18.0 | 15.0 | 11.0 | 9.0 | — |
| 12 | 6 | .40 | .717 | 44.0 | 40.0 | 26.0 | 22.0 | 16.0 | 13.0 | — |
| 12 | 6 | .50 | .883 | 54.0 | 52.0 | 31.0 | 26.0 | 19.0 | 15.0 | 10.0 |
| 14 | 6 | .40 | .698 | 46.0 | 43.0 | 31.0 | 26.0 | 19.0 | 15.0 | 10.0 |
| 14 | 6 | .50 | .873 | 57.0 | 59.0 | 38.0 | 31.0 | 24.0 | 19.0 | 12.0 |
| 15 | 5 | .42 | .647 | 42.0 | 47.0 | 28.0 | 24.0 | 18.0 | 14.0 | 9.5 |
| 15 | 6 | .50 | .880 | 59.0 | 62.0 | 42.0 | 35.0 | 26.0 | 21.0 | 14.0 |
| 16 | 6 | .55 | .847 | 62.0 | 73.0 | 45.0 | 38.0 | 28.0 | 22.0 | 15.0 |
| 18 | 7 | .55 | .928 | 75.0 | — | 64.0 | 53.0 | 40.0 | 32.0 | 21.0 |
| 20 | 7½ | .60 | 1.01 | 89.0 | — | 83.0 | 69.0 | 52.0 | 41.0 | 27.0 |
| 24 | 7½ | .60 | 1.07 | 100.0 | — | 102.0 | 92.0 | 69.0 | 55.0 | 36.0 |

Span should not exceed 20 times the depth of single joist.

Example for reading above table :—10 x 8 joist, with thickness web .60 inch, flange .97, weighs 70 lb. per foot run. Safe distributed load for 10 feet span is 34 tons ; for 16 feet span, 21 tons. Calculated at quarter the breaking strain.

## ANGLE AND TEE IRON.

Weight per Foot.

| Size. | Thickness. | Weight. lbs. | Size. | Thickness. | Weight. lbs. |
|---|---|---|---|---|---|
| $\frac{3}{4}$ x $\frac{3}{4}$ | 3/16 | 0.86 | $2\frac{1}{2}$ x $2\frac{1}{2}$ | 5/16 | 4.93 |
| 1 x 1 | 3/16 | 1.16 | $2\frac{1}{2}$ x $2\frac{1}{2}$ | $\frac{3}{8}$ | 5.88 |
| 1 x 1 | $\frac{1}{4}$ | 1.56 | $2\frac{1}{2}$ x $2\frac{1}{2}$ | 7/16 | 6.82 |
| $1\frac{1}{4}$ x $1\frac{1}{4}$ | $\frac{1}{4}$ | 1.95 | $2\frac{1}{2}$ x $2\frac{1}{2}$ | $\frac{1}{2}$ | 7.75 |
| $1\frac{1}{4}$ x $1\frac{1}{4}$ | 5/16 | 2.38 | 3 x 3 | 5/16 | 5.95 |
| $1\frac{1}{2}$ x $1\frac{1}{2}$ | $\frac{3}{8}$ | 2.36 | 3 x 3 | $\frac{3}{8}$ | 7.11 |
| $1\frac{1}{2}$ x $1\frac{1}{2}$ | 5/16 | 2.91 | 3 x 3 | 7/16 | 8.25 |
| $1\frac{1}{2}$ x $1\frac{1}{2}$ | $\frac{3}{8}$ | 3.46 | 3 x 3 | $\frac{1}{2}$ | 9.44 |
| $1\frac{3}{4}$ x $1\frac{3}{4}$ | 5/16 | 3.40 | $3\frac{1}{2}$ x $3\frac{1}{2}$ | 5/16 | 7.05 |
| $1\frac{3}{4}$ x $1\frac{3}{4}$ | $\frac{3}{8}$ | 4.04 | $3\frac{1}{2}$ x $3\frac{1}{2}$ | $\frac{3}{8}$ | 8.34 |
| 2 x 2 | $\frac{1}{4}$ | 3.16 | $3\frac{1}{2}$ x $3\frac{1}{2}$ | 7/16 | 9.70 |
| 2 x 2 | 5/16 | 3.91 | $3\frac{1}{2}$ x $3\frac{1}{2}$ | $\frac{1}{2}$ | 11.04 |
| 2 x 2 | $\frac{3}{8}$ | 4.66 | $3\frac{1}{2}$ x $3\frac{1}{2}$ | 9/16 | 12.34 |
| 2 x 2 | 7/16 | 5.39 | 4 x 4 | 5/16 | 8.67 |
| 2 x 2 | $\frac{1}{2}$ | 6.04 | 4 x 4 | $\frac{3}{8}$ | 9.65 |
| $2\frac{1}{4}$ x $2\frac{1}{4}$ | 5/16 | 4.42 | 4 x 4 | 7/16 | 11.16 |
| $2\frac{1}{4}$ x $2\frac{1}{4}$ | $\frac{3}{8}$ | 5.27 | 4 x 4 | $\frac{1}{2}$ | 12.70 |
| $2\frac{1}{4}$ x $2\frac{1}{4}$ | 7/16 | 6.10 | 4 x 4 | 9/16 | 14.17 |
| $2\frac{1}{4}$ x $2\frac{1}{4}$ | $\frac{1}{2}$ | 6.93 | 5 x 5 | $\frac{1}{2}$ | 15.50 |

## WEIGHTS OF FLAT BAR STEEL.

In lbs. per Lineal Foot.

| Breadth in ins. | Thickess in fractions of an inch. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 4-16 | 5-16 | 6-16 | 7-16 | 8-16 | 10-16 | 12-16 | 14-16 | 1 in. |
| 1 | ·85 | 1·06 | 1·28 | 1·49 | 1·70 | 2·13 | 2·55 | 2·98 | 3·40 |
| $1\frac{1}{8}$ | ·96 | 1·20 | 1·43 | 1·67 | 1·91 | 2·39 | 2·87 | 3·35 | 3·83 |
| $1\frac{1}{4}$ | 1·06 | 1·33 | 1·59 | 1·86 | 2·13 | 2·66 | 3·19 | 3·72 | 4·25 |
| $1\frac{3}{8}$ | 1·17 | 1·46 | 1·75 | 2·05 | 2·34 | 2·92 | 3·51 | 4·09 | 4·68 |
| $1\frac{1}{2}$ | 1·28 | 1·59 | 1·91 | 2·23 | 2·55 | 3·19 | 3·83 | 4·46 | 5·10 |
| $1\frac{3}{4}$ | 1·49 | 1·86 | 2·23 | 2·60 | 2·98 | 3·72 | 4·46 | 5·21 | 5·95 |
| 2 | 1·70 | 2·13 | 2·55 | 2·98 | 3·40 | 4·25 | 5· 0 | 5·95 | 6·80 |
| $2\frac{1}{4}$ | 1·91 | 2·39 | 2·87 | 3·35 | 3·83 | 4·78 | 5·74 | 6·69 | 7·65 |
| $2\frac{1}{2}$ | 2·13 | 2·66 | 3·19 | 3·72 | 4·25 | 5·31 | 6 38 | 7·44 | 8·50 |
| $2\frac{3}{4}$ | 2·34 | 2·92 | 3·51 | 4·09 | 4·68 | 5·84 | 7·01 | 8·18 | 9·35 |
| 3 | 2·55 | 3·19 | 3·83 | 4·46 | 5·10 | 6·38 | 7·65 | 8·93 | 10·20 |
| $3\frac{1}{4}$ | 2·76 | 3·45 | 4·14 | 4·83 | 5·53 | 6·91 | 8·29 | 9·67 | 11 05 |
| $3\frac{1}{2}$ | 2 98 | 3 72 | 4·46 | 5·21 | 5·95 | 7·44 | 8·93 | 10 41 | 11·90 |
| 4 | 3·40 | 4·25 | 5·10 | 5·95 | 6·80 | 8·50 | 10·20 | 11·90 | 13 60 |
| $4\frac{1}{2}$ | 3·83 | 4·78 | 5·74 | 6·69 | 7·65 | 9·56 | 11·48 | 13·39 | 15·30 |
| 5 | 4·25 | 5·31 | 6·38 | 7·44 | 8·50 | 10·63 | 12·75 | 14·88 | 17 00 |
| 6 | 5 10 | 6·38 | 7.65 | 8·93 | 10·20 | 12·75 | 15·30 | 17·85 | 20 40 |

## WEIGHTS OF SQUARE AND ROUND STEEL,

*From Jaffrays' Handy Tables.*

IN LBS. PER LINEAL FOOT.

| Diameter. | Square Steel. | Round Steel. | Diameter | Square Steel. | Round Steel. |
|---|---|---|---|---|---|
| Inches. | Lbs. | Lbs. | Inches. | Lbs. | Lbs. |
| 3/16 | ·120 | ·094 | 2 | 13·60 | 10·68 |
| 1/4 | ·213 | ·167 | 2 1/8 | 15·35 | 12·06 |
| 5/16 | ·332 | ·261 | 2 1/4 | 17·21 | 13 52 |
| 3/8 | ·478 | ·376 | 2 3/8 | 19· 8 | 15 06 |
| 7/16 | ·651 | ·511 | 2 1/2 | 21·25 | 16·69 |
| 1/2 | ·849 | ·668 | 2 5/8 | 23·43 | 18·40 |
| 9/16 | 1·076 | ·845 | 2 3/4 | 25·71 | 20·19 |
| 5/8 | 1·328 | 1·043 | 2 7/8 | 28·10 | 22·07 |
| 11/16 | 1·607 | 1·262 | 3 | 30·60 | 24·03 |
| 3/4 | 1·912 | 1·502 | 3 1/4 | 35·91 | 28·21 |
| 13/16 | 2·245 | 1·763 | 3 1/2 | 41·65 | 32·71 |
| 7/8 | 2·603 | 2·044 | 3 3/4 | 47·81 | 37·55 |
| 15/16 | 2·988 | 2·347 | 4 | 54·40 | 42·73 |
| 1 | 3·400 | 2·670 | 4 1/4 | 61·41 | 48·23 |
| 1 1/8 | 4·303 | 3·380 | 4 1/2 | 68·85 | 54·07 |
| 1 1/4 | 5·312 | 4·172 | 4 3/4 | 76·71 | 60·25 |
| 1 3/8 | 6·428 | 5·049 | 5 | 85·00 | 66·76 |
| 1 1/2 | 7·650 | 6·008 | 5 1/4 | 93·71 | 73·60 |
| 1 5/8 | 8 978 | 7·051 | 5 1/2 | 102·85 | 80·78 |
| 1 3/4 | 10·412 | 8·178 | 5 3/4 | 112·41 | 88·29 |
| 1 7/8 | 11.953 | 9·388 | 6 | 122·40 | 96·13 |

## SQUARE AND ROUND IRON.—Per Foot Run.

At 2d. per lb., or 18/8 per cwt.

| In. | Square. | | Round. | | In. | Square. | | Round. | | In. | Square. | | Round | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | s. | d. | s. | d. | | s. | d. | s. | d. | | s. | d. | s. | d. |
| 1/4 | 0 | 0 1/2 | 0 | 0 1/2 | 1 1/8 | 0 | 8 1/2 | 0 | 7 | 2 | 2 | 3 | 1 | 9 |
| 3/8 | 0 | 1 | 0 | 1 | 1 1/4 | 0 | 10 1/2 | 0 | 8 1/2 | 2 1/8 | 2 | 6 | 2 | 0 |
| 1/2 | 0 | 2 | 0 | 1 1/2 | 1 3/8 | 1 | 1 | 0 | 10 | 2 1/4 | 2 | 10 | 2 | 2 1/2 |
| 5/8 | 0 | 2 1/2 | 0 | 2 | 1 1/2 | 1 | 3 | 1 | 0 | 2 3/8 | 3 | 2 | 2 | 6 |
| 3/4 | 0 | 4 | 0 | 3 | 1 5/8 | 1 | 6 | 1 | 2 | 2 1/2 | 3 | 6 | 2 | 9 |
| 7/8 | 0 | 5 | 0 | 4 | 1 3/4 | 1 | 8 1/2 | 1 | 4 | 2 5/8 | 3 | 10 | 3 | 0 |
| 1 | 0 | 6 1/2 | 0 | 5 | 1 7/8 | 1 | 11 1/2 | 1 | 6 1/2 | 2 3/4 | 4 | 2 1/2 | 3 | 3 |

**Steel.**—For rod and bar steel per lineal foot reckon three times the above prices, or 6d. per lb., which is about the present price.

WEIGHT OF 100 IRON PAN-HEADED RIVETS IN LBS.

Length under head to point.
Diameter of Rivets in inches.

| | 5-16 | 6-16 | 7-16 | 8-16 | 9-16 | 10-16 | 12-16 | 14-16 | 1 in. |
|---|---|---|---|---|---|---|---|---|---|
| ins. | lbs. | lbs. | lbs. | lbs. | lbs | lbs. | lbs. | lbs. | lbs. |
| ½ | 2·06 | 3·26 | 4·83 | 6·82 | 9·28 | 12·25 | 19·94 | 30· 8 | 43·63 |
| 5/8 | 2·33 | 3·64 | 5 35 | 7·50 | 10·14 | 13 32 | 21·48 | 32·36 | 46 36 |
| 3/4 | 2·60 | 4·03 | 5·87 | 8·18 | 11·00 | 14·38 | 23·01 | 34·45 | 49·09 |
| 7/8 | 2 86 | 4·41 | 6·39 | 8·83 | 11·86 | 15·45 | 24·54 | 36·54 | 51 81 |
| 1 | 3·13 | 4·79 | 6·92 | 9·54 | 12·73 | 16·51 | 26·08 | 38·63 | 54·54 |
| 1¼ | 3·66 | 5·56 | 7·96 | 10·91 | 14·45 | 18·64 | 29·15 | 42·80 | 60·00 |
| 1½ | 4·19 | 6·33 | 9·00 | 12·27 | 16·18 | 20·77 | 32·21 | 46·98 | 65·45 |
| 1¾ | 4·73 | 7·09 | 10·05 | 13·64 | 17·91 | 22·90 | 35·28 | 51·16 | 70·90 |
| 2 | 5·26 | 7·86 | 11·09 | 14·99 | 19·63 | 25·03 | 38·35 | 55·33 | 76·36 |
| 2¼ | 5·79 | 8·63 | 12·14 | 16·36 | 21·36 | 27·17 | 41·42 | 59·51 | 81·81 |
| 2½ | 6·32 | 9·40 | 13·18 | 17·73 | 23·08 | 29·30 | 44·49 | 63·68 | 87·27 |
| 2¾ | 6·86 | 10·17 | 14·22 | 19·09 | 24·81 | 31·43 | 47·55 | 67·86 | 92·72 |
| 3 | 7·39 | 10 93 | 15·27 | 20 45 | 26·53 | 33·56 | 50·62 | 72·04 | 98·18 |
| 3¼ | 7·92 | 11·70 | 16·31 | 21·82 | 28·26 | 35·69 | 53·69 | 76·21 | 103·63 |
| 3½ | 8·45 | 12·46 | 17·36 | 23·18 | 29'99 | 37 82 | 56·76 | 80·39 | 109·08 |
| 3¾ | 8·99 | 13·23 | 18·40 | 24 54 | 31·71 | 39·95 | 59·8' | 84·56 | 114 54 |
| 4 | 9·52 | 14·00 | 19·44 | 25 91 | 33·44 | 42·08 | 62 89 | 88·74 | 119·99 |

## WIRE FENCING.

### ANNEALED DRAWN BLACK IRON FENCING WIRE.

*In Melbourne, Sydney and Brisbane.*

| Wire Gauge. | WEIGHT OF FENCE PER MILE FOR 1 Wire. | | | 2 Wires. | | | 3 Wires. | | | 4 Wires. | | | 5 Wires. | | | Length of Cwt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cwt. | qr. | lbs. | Cwt. | qr. | lbs. | Cwt. | qr. | lbs. | Cwt. | qr. | lbs. | Cwt. | qr. | lbs. | Yards |
| 4 | 6 | 3 | 17 | 13 | 3 | 0 | 22 | 2 | 23 | 27 | 2 | 12 | 34 | 2 | 1 | 255 |
| 5 | 5 | 3 | 6 | 11 | 2 | 12 | 17 | 1 | 18 | 23 | 0 | 24 | 29 | 0 | 2 | 303 |
| 6 | 4 | 3 | 14 | 9 | 3 | 0 | 14 | 2 | 14 | 19 | 2 | 0 | 24 | 1 | 19 | 361 |
| 7 | 4 | 0 | 13 | 8 | 0 | 26 | 12 | 1 | 11 | 16 | 1 | 24 | 20 | 2 | 9 | 428 |
| 8 | 3 | 1 | 23 | 6 | 3 | 18 | 10 | 1 | 15 | 13 | 3 | 8 | 17 | 1 | 3 | 509 |
| 9 | 2 | 3 | 15 | 5 | 3 | 2 | 8 | 2 | 17 | 11 | 2 | 4 | 14 | 1 | 19 | 609 |
| 10 | 2 | 1 | 12 | 4 | 2 | 24 | 7 | 0 | 8 | 9 | 1 | 20 | 11 | 3 | 4 | 748 |
| 12 | 1 | 1 | 18 | 2 | 3 | 8 | 4 | 0 | 20 | 5 | 2 | 16 | 7 | 0 | 6 | 1244 |

PRICES PER SHEET OF COR. GAL. IRON AT £24 PER TON.

| | 5 feet | | 6 feet | | 7 feet | | 8 feet | | 9 feet | | 10 feet | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| 24 Gauge .. | 3 | 0 | 3 | 6 | 4 | 1 | 4 | 8 | 5 | 4 | 6 | 0 |
| 26 Gauge ... | 2 | 2 | 2 | 7½ | 3 | 1 | 3 | 6½ | 4 | 0 | 4 | 6 |

## WROUGHT IRON.

Per cwt. Current Prices.

| | s. d. |
|---|---|
| Wrought bar, round or half-round iron .. .. .. | 11s. to 13 0 |
| Best Charcoal Iron .. .. .. .. .. | 18s. to 20 0 |
| Sheet Iron, 10 to 28 gauge .. .. .. .. | 14s. to 18 0 |
| Plate Iron, best charcoal plate, $\frac{1}{8}$″ to $\frac{5}{8}$″ thick .. .. | 16s. to 20 0 |
| Angle T and channel iron .. .. .. .. .. | 14s. to 15 0 |

N.B.—For large " Lines " *see* Weekly List.

| WROUGHT IRON. Fixed, per lb. | From. s. d. | To. s. d. |
|---|---|---|
| **Wharves.**—Wrought iron in straps, shoes, rings and straps of mooring or other piles, anchor and other bolts and dumps for planking .. .. .. | 0 4 | 0 6 |
| **Bridges.**—Bolts from 15in. to 36in. long, including tie-bolts for king posts .. .. .. .. .. | 0 4 | 0 5 |
| **Wrought Iron** cell doors for gaols, including hinges, straps, staples and fastenings, fixed complete, about £6/12/– each .. .. .. .. .. or | 0 8 | 0 9 |
| Plain square balusters for stairs, &c. .. .. .. | 0 3 | 0 4 |
| Iron hand-rail and square balusters, including fixing and lead .. .. .. .. .. .. .. | 0 6 | 0 7 |
| Iron roofs complete, including angle, T. and rod iron for rafters, struts, king and queen posts, tie-rods, &c.. . | 0 4 | 0 5 |
| **Gates and Girders—** | | |
| Framed gates, with hinges and cast spear heads, &c., fixed, per lb. .. .. .. .. .. .. | 0 6 | 0 7 |
| Hydraulic stamped spear heads, rosettes, &c., fixed, per lb. .. .. .. .. .. .. .. | 0 9 | 0 10 |
| Wrought iron plate and box girders, colonial .. .. | 0 $2\frac{1}{2}$ | 0 $3\frac{1}{2}$ |
| Ditto, imported .. .. .. .. .. .. | 0 2 | 0 3 |
| **Rolled Joists—** | | |
| Rolled iron double headed joists or girders, ditto, fixed, per lb. .. .. .. .. .. .. .. | 0 $1\frac{1}{2}$ | 0 2 |
| Rolled steel joists .. .. .. .. .. .. | 0 $2\frac{1}{2}$ | 0 3 |
| Guard bars, with strap ends, unframed, for windows of stores, gaols, &c., do.. .. .. .. .. | 0 4 | 0 5 |
| Strong brackets, framed with braces .. .. .. | 0 6 | 0 8 |
| Iron work for pumps .. .. .. .. .. .. | 0 7 | 0 9 |
| Plate Iron Tanks .. .. .. .. .. .. | 0 $2\frac{1}{2}$ | 0 $3\frac{1}{2}$ |
| Chimney and bearing bars.. .. .. .. .. | 0 3 | 0 $3\frac{1}{2}$ |
| Ties and straps in floors and roofs.. .. .. .. | 0 4 | 0 5 |

| **Wrought Iron**— | | From | | To | |
|---|---|---|---|---|---|
| Straps or T. hinges, with hooks and bolts | | 0 | 6 | 0 | 7 |
| Screw bolts, nuts and washers, and king-post stirrups | | 0 | 5 | 0 | 6 |
| Pile shoes, with straps and nails | | 0 | 4 | 0 | 5 |
| Framed grating for sewers and sink-stones | | 0 | 4 | 0 | 5 |
| Cradle bars, framed, 4d., ditto, trussed, with screws and nuts | | 0 | 5 | 0 | 6 |
| Galvanising wrought iron, extra | per cwt. | 18 | 0 | 24 | 0 |

N.B.—Galvanizing wrought iron is said to make it brittle and unworkable so that it cannot be repaired or altered without extra cost. It also adds to the weight about 1½ ounces per sup. foot of surface galvanized, and about 2 ounces per sup. foot of cast iron galvanized.

## SPECIAL WROUGHT IRO WORK.

| | | | |
|---|---|---|---|
| Gates, Staircasing, Balustrating, and Balconette work, per super. foot | 7 | 6 | upwards |
| Ornamental railings, for balconies, galleries, &c., per super. foot | 7 | 6 | ,, |
| Heavy railing or guard rails, for basement windows, and plain grills, per super. foot | 7 | 6 | ,, |
| **Balusters,** for staircases, each, from | 10 | 0 | ,, |
| **Ornamental** wrought iron work, for grilles, railings, lift enclosures, &c., according to design, per sup. ft. from | 6 | 0 | ,, |

**Interlaced Iron Meshwork**—

for Lift enclosures, offices—All gauges, per super ft.

| | | | |
|---|---|---|---|
| 1¼ Plain mesh, ¼ x 1/20″ iron | 3 | 0 | |
| 1½″ ,, ⅜ x 1/16″ ,, from | 2 | 0 | |
| 1¼″ double strand ¼ x 1/20″ | 3 | 6 | |
| 1½ ,, ⅜ x 1/16″ from | 2 | 6 | |

**Collapsible Gates and Shutters,** Bostwick Pat., for doors and windows, cartways, &c., of public, private, or business premises : expanded measurement, per sup. ft. 6 0

Add 1/6 per ft. if hinged round. Manufacturers, G. E. Crane & Sons.

| | | | |
|---|---|---|---|
| Collapsible gates, Bostwick's Patent, for shop fronts, entrances, lift doors, &c., fixed complete, per super. ft. | 8 | 6 | |
| Ditto, C. H. Richard's Patent, with rollers, guides and fastenings complete, fixed, per super foot, from | 7 | 0 | |

Larger quantities and areas at reduced prices. Works, Newtown, Sydney.

A gate 4′6″ wide will collapse into 4½″ wide, and a 10ft. gate into 12 inches.

**Steel Sashes** and **Frames,** 1 x ½ in. upwards, casement or pivot hung, with or without frames, per sup. ft., from 4 6

| | From s. d. | To s. d. |
|---|---|---|
| Verandah and balcony 6 feet wide, including all woodwork, ironwork, gal. cor. iron roof, &c., complete, per lineal foot .. .. .. | 35 0 | 45 0 |
| Verandah only, with iron roof, ditto. do. .. | 16 0 | 23 0 |
| Hanging a pair of iron gates with portable or other crane, gates about 3 tons, 8 men, 10 hours .. .. .. .. .. .. | 100 0 | 120 0 |
| Ditto, single or side-gates, with above, everything prepared. .. .. .. .. | 20 0 | 25 0 |

## SUMMARY OF PRESENT PRICES.

| Material, Labour, &c.—Per cwt. | s. d. |
|---|---|
| Rolled Steel Joists, Seimen's Martin's, or Bessemer Basic .. | 18 6 |
| Ditto, if compound, extra per rivet, each .. .. .. .. | 0 6 |
| Wrought iron plate, bars, angles, &c. .. .. .. .. | 13 6 |
| Wrought forgings, per lb. .. .. .. .. .. .. | 0 4 |
| Wrought arch bars, per lb. .. .. .. .. .. .. | 0 3 |
| Cast iron columns, including stock pattern, per cwt. .. .. | 17 6 |
| Cast water pipes, bends, elbows, 3″, 4″, and 6″, stock patterns .. | 15 6 |
| Iron castings, exclusive of pattern .. .. .. .. | 18 0 |

### Present Price ROLLED STEEL JOISTS.—Per Ton.

| | |
|---|---|
| Dorman Long & Co., up to 14″ x 6″ .. .. .. .. | 14 0 0 |
| Foreign girders .. .. .. .. .. .. .. | 12 0 0 |
| Labour on above and profit .. .. .. .. | £4 to 8 0 0 |
| Cut to lengths, per cwt. .. .. .. .. .. .. | 0 14 0 |

**Plate Iron Tanks** cost about the same by weight as girders, with the addition of the cost of caulking, which is about equal to riveting. The sides of the plates should lap, and be double riveted, and the joints effectually caulked.

### Useful Cements.

**Rust for Iron.**—Wrought iron filings, 65 parts ; sal-ammoniac, $2\frac{1}{2}$ ; sulphur (flowers), $1\frac{1}{2}$ ; sulphuric acid, 1. Mix dry, sulphuric acid with sufficient water then added.

**Iron Pipes.**—Wrought-iron filings, 45 parts ; clay, 20 ; china clay, 15 ; common salt solution, 8. If china clay cannot be found, fire-clay will do.

**Iron to Stone.**—Fine iron filings, 10 parts ; plaster of Paris, 30 ; sal-ammoniac, $\frac{1}{2}$. Mix with weak vinegar, and use at once.

## GIRDERS.

**Compound Girders,** up to two feet deep, for general building purposes, are usually made by one or more steel joists riveted to plates top and bottom, which give additional strength to the joists in compression and tension strains according to thickness of plates.

Thus, two joists, 18″ x 7″ at 20 feet span (see combined safe load, as per table steel joists, 32 tons each) = 64 tons ;

But with two plates, 16″ $\frac{5}{8}$″x riveted to top and bottom flanges, the combined safe load should be 82½ tons, increasing the strength 25 per cent. or more.

**Compound Girders,** English brand, with top plate riveted on every 12 inches, 20/– per cwt.

Ditto, top and bottom plates riveted on, 19/– per cwt.

Hoisting and setting, reckon 2/– to 3/– per cwt. per floor.

## IRON GIRDER BRIDGES.

**Labour only. Per cwt. including scaffolding.**

Wages of Fitter, 1/6, and Holder-up, 1/– per hour.

| | s. | d. |
|---|---|---|
| Fitting and riveting large lattice girders, previously put together, over land bays and spans .. .. .. .. | 4 | 4 |
| Ditto, ditto, over water, rivers, &c. .. .. .. .. | 5 | 0 |
| Riveting only, per 100 rivets, from 11/– to .. .. .. | 12 | 6 |
| Ditto ditto, with machine, from 3/3 to .. .. .. .. | 4 | 2 |
| Making, punching, riveting, constructing, fitting, and fixing large plate girders for bridges, &c. .. .. .. .. | 15 | 0 |
| Ditto, lattice or triangular girders, or large tanks .. .. | 20 | 0 |
| Ditto, small box or plate girders for floors, shop-windows, &c., or small tanks, caulked .. .. .. .. .. | 22 | 0 |

**Wrought Iron Pipes** are now made with thin sheets of black iron being riveted together and dipped in hot asphalte ; they are flanged and made from 6 to 60 inches diameter, the distance of the rivets apart and the thickness of the iron being regulated by the pressure they are required to resist. Where carriage is an object, there is a considerable saving in the cartage. They have been generally used for water supply near Melbourne at a cost of £25 to £27 per ton. They were tried for compressed air in Sandhurst, but would not answer, as air in compressing gets hot, melting the asphalte, and causing leakage.

**Steel Water Pipes** have been made at Greymouth, New Zealand. The three-quarters of a mile of 30-inch diameter pipes, laid at the local reservoir, have to stand a pressure of 60 feet ; pipes of smaller diameter were laid in the same way, showed no signs of weakness on a 300 feet head of water.

Labour.—Making joint of 4ft. diam. cast iron water main pipe—lead, 2½ x ½ = 150lbs. lead.

Preparing single joint, melting lead, &c., two men, one day, 16/–. For a number of joints reckon 6/– to 8/– each.

## Wrought Iron Girders.

Wrought iron is now extensively used in the construction of girders and breastsummers, to support walls over shop fronts, heavily loaded floors of mills, stores, &c., and is superseding wooden and cast iron girders. Cast iron is liable to crack from sudden shocks, or from the sudden application of cold water while in a heated state, and in case of fire is little better than wood.

The following table for wrought iron girders is for such spans as are most in use without the intervention of columns. To support walls and heavy machinery, the box girder will be found the best, but for loaded floors, the plate girder offers many advantages :—

| Spans. | Height of 18 inch walls supported. | Constant load of walls, floors and roofing. | Sectional area of bottom of girder. | Sectional area of top of girder. | Depth of girder. | Thickness of vertical plates. | Angle irons. |
|---|---|---|---|---|---|---|---|
| 10 ft. | 10 ft. | 13 ton. | 5 in. | 6 in. | 9 in. | 3-16 in. | 3x3x¼ in. |
| do. | 15 ,, | 18 ,, | 6 ,, | 7 ,, | do. | do. | |
| do. | 20 ,, | 24 ,, | 8½ ,, | 10 ,, | do. | do. | |
| 15 ft. | 10 ,, | 20 ,, | 8 ,, | 9 ,, | 12 in. | ¼ in. | 3x3x¼ in. |
| do. | 15 ,, | 26 ,, | 10 ,, | 12 ,, | do. | do. | |
| do. | 20 ,, | 35 ,, | 13½ ,, | 15 ,, | do. | do. | |
| 20 ft. | 10 ,, | 5 ,, | 9½ ,, | 11 ,, | 16 in. | 5-16 in. | 3x3x¼ 2½x2½x⅜ in. |
| do. | 15 ,, | 35 ,, | 13½ ,, | 15 ,, | do. | do. | |
| do. | 20 ,, | 46 ,, | 18 ,, | 21 ,, | do. | do. | |

These beams are calculated to break with about four times the loads, in tons, here mentioned,

Wrought iron plate girders, of the same strength as the box girders, given above, may be made by increasing the area of the top and bottom plates ¼ inch, the thickness of the vertical plates for the 10 feet girders ⅜ inch, and the 15 and 20 feet girders. 3-16ths inch.

In plate iron girders, not only the sectional areas must be correct, but also the perfect arrangement of the joints must be attended to.

All joints should butt close together, covered with proper jointing strips, and no two joints should occur in the same place. In punching the plates and angle irons, the sectional areas should be diminished only to the extent necessary for rivets of the proper size ; and plates, &c., imperfectly punched, should be rejected.

The rivets should be of Lowmoor or other superior iron, and where the strain depends on them, their *collective areas should equal the sectional areas of the plates connected.*

All girders should be so secured on walls as to admit of expansion and contraction.

## CASTINGS FROM STOCK PATTERNS.

| | s. | d. |
|---|---|---|
| Verandah column, fluted, with cap and base, 10ft. x 4″ .. .. | 45 | 0 |
| Ditto, reeded, with top for brackets, 10ft. x 3½″.. .. .. | 35 | 0 |
| Ditto, do. do. do. 10ft. x 4½ x 4¾ .. .. .. | 55 | 0 |

**Composite Columns—**

| | | | |
|---|---|---|---|
| Gal. iron composition columns, up to 8 feet long, with cast zinc capitals and bases, from 3 to 4½ inches diam. | 13/– to | 23 | 0 |
| Ditto. from 5 to 6in. diameter .. .. .. | 26/– to | 31 | 0 |

**Balcony Railing—**

| | | | |
|---|---|---|---|
| Balcony railing, cast iron, 2ft. 9in. high, 14 to 16lb. per foot run, from .. .. .. .. .. .. | 2/3 to | 3 | 6 |
| Wrought top rail, 1/3 per ft., Stays, 3/6 ; Gates, 15/– each. | | | |
| Cast iron ornamental brackets, 16″ x 20″, 2/– to 2/6 ; heavy, 18″ x 22″, each .. .. .. .. .. .. | | 3 | 0 |

**Panelling Frieze—**

| | | | |
|---|---|---|---|
| Cast iron frieze, 6in., 1/– ; 9in.. 1/3 ; 11in., 1/8 ; 15in., 2/– foot run. | | | |
| Cast iron panelling, 8in., 1/6 ; 11in., per foot run .. .. | | 2 | 9 |
| Cast iron Ventilators, 24 x 9, each .. .. .. .. | | 3 | 0 |
| Finials, 18″ long, 4/– ; 2ft., 5/– ; 2′6″, 7/6 ; 3ft., each .. | | 10 | 0 |

## CIRCULAR IRON SPIRAL STAIRCASE.

| | £ | s. | d. |
|---|---|---|---|
| Five feet diam. with 4in. x ⅜ in. external diameter, wrought iron screwed tube newel, 24—7in. steps in each flight of 14 feet in height. Treads and risers to be cast in one piece of ¾in. metal with diaper pattern on tread and ornamental perforations in riser. The heads to have rounded nosing with scotia, the steps to be cast with lugs for bolting with ¾in. bolts, and each step to have collar or ring for hanging round newel. | | | |
| Cost per step, properly screwed to floors .. .. .. | 1 | 15 | 0 |
| Rounded 2in. diameter spiral cedar handrail, screwed to 1″ x ½″ wrought iron spiral bar let into the underside of cedar handrail, the whole supported by ⅞ x ⅞ square iron balusters filled in with wrought iron scroll work, complete, per step .. .. .. .. .. .. .. .. | 0 | 15 | 0 |

N.B.—The 4in. tube newel to be in two lengths to be strengthened at the junction by a 3¼′ x ⅜″ hollow dowel 2ft. long, secured by two rivets flush outside.

**Imported Iron Spiral staircases** of stock sizes can be obtained at a cheaper rate than the above, viz. :—3′6″ diam., 35/– ; 4′, 38/– ; 4′6″, 43/– ; 5′, 51/– per foot in height.

## DIVER AND CYLINDER.

**Diving Apparatus** complete in the Australian cities from £135 to. to £175.

Two men can work the air pump to a depth of 51 feet.

In a diving bell men can work for several hours at this depth under a pressure of 37½lbs. per square inch. At a depth of 90ft. they can work only for about an hour without seriously suffering from paralysis.

**Iron cylinders,** for bridges, wharves, &c., are sunk by Triger's *plenum process*, which consists in forcing air into the cylinder to such an extent as to force out the water below the bottom of the cylinder, leaving the earth or soil nearly dry ; the men pass in and out of the cylinder by an *air lock*, which is generally of the same diameter as the cylinder, and about 6 ft. high ; it is secured to the top of the cylinder, and is fitted with air-tight valves at top and bottom, through which the men pass. These men are entirely at the mercy of those employing them, and may be injured for life by paralysis, caused by working too long, or at too great a depth. The laws relating to the supply of air, &c., are similar in their results to those relating to the diving dress and diving bell. The iron cylinders of the Darling Harbour Wharf, Sydney, and the Parramatta River iron girder bridge, near Sydney, were sunk by the *plenum process.* See " Trautwine's Engineer's Pocket Book.") See Metal Worker.

## BAKERS' OVENS.

### Iron Fittings. For Small Bakehouses.

| | £ | s. | d. |
|---|---|---|---|
| Cast iron baker's oven, including 8 firebars, 2'6" long, 2 bearers, 2 dampers and frames, 10" x 12", 4 of 18" x ⅝" rods with nuts ; furnace and ash-pit doors on iron frame, 45" x 18" ; oven door, 18½" x 12" high on frame 25" x 16" ; peel plate, 46" front x 18" wide ; set complete.. .. .. .. | 7 | 10 | 0 |

### CITY BAKEHOUSE FITTINGS.

Joseph Baker & Sons, Ltd., patent fittings for baker's ovens, ordinary English prices—

| | | | |
|---|---|---|---|
| Oven doors, 18in. wide, with frame and brass fitting slide and peel rest .. .. .. .. .. .. | 5 | 10 | 0 |
| Ditto, 24 inches .. .. .. .. .. .. | 7 | 10 | 0 |
| Ditto do. with steam damper .. .. .. | 9 | 10 | 0 |
| Patent slide doors, patent oven light and pyrometer, Flush peet rest .. .. .. .. .. .. | 17 | 10 | 0 |
| Patent time register .. .. .. .. .. .. | 0 | 12 | 6 |
| Patent Pyrometer, from £2/15/- to.. .. .. .. | 5 | 10 | 0 |
| Proving doors, 16" wide, £1/11/- to.. .. .. .. | 2 | 0 | 0 |
| Search lamps, .. .. .. .. .. .. | 0 | 4 | 9 |
| Illuminators .. .. .. .. .. .. .. | 3 | 3 | 0 |
| Oven lights .. .. .. .. .. .. .. | 5 | 0 | 0 |
| Patent Steam Generating System for Vienna Ovens .. | 17 | 10 | 0 |

*See* Fire Clay, Fire Bricks, Lumps and Tiles, Brickwork.

# METAL WORK.

## ALUMINIUM.

Extracts from Richards on Aluminium.

Aluminium is the lightest of commercial metals, $\frac{1}{3}$ as heavy as iron, hard as copper, very ductile and easy to cast in iron or sand moulds, and hardens more when being worked.

Being non-magnetic and non-tarnishing, it can be used for electrical work where a magnetic metal would be useless, but the electrical conductiveness is 34 per cent. less than copper, and requires less annealing than copper. With the exception of lead, it unites readily with all the common metals.

Hydrochloric acid is its natural solvent.

For light structural purposes it is invaluable.

Pittsburgh Reduction Company, Niagara Falls, have the largest works and output.

**Price of Aluminium.**

| | |
|---|---|
| Ingots, per lb. | 3 0 |
| Sheets, per lb. | 3 6 |
| Round bars, per lb. | 4 0 |
| Flat bars, per lb. | 5 0 |
| Wire, per lb. | 4 6 |

## COPPER AND ITS ALLOYS.

| Metal Manufactured. | Copper. | Zinc. | Nickel. | Tin. | |
|---|---|---|---|---|---|
| German Silver | 60% | 20% | 20% | — | 100 pts. |
| White Metal | 56% | 5% | 39% | — | 100 pts. |
| Gun Metal | 90% | — | — | 10% | 100 pts. |
| Bell Metal | 80% | — | — | 20% | 100 pts. |
| Rolled Brass | 60% | 40% | — | — | 100 pts. |
| Flexible Bronze | 95% | — | — | 5% | 100 pts. |

## MELTING POINTS OF METALS.

Prof. Roberts-Austen.

| | Deg. Fahr. | | Deg. Fahr. |
|---|---|---|---|
| Aluminium (pure) | 1,289 | Mercury | —39 |
| Antimony | 810 | Nickel | 2,810 |
| Bismuth | 510 | Platinum | 3,080 |
| Brass | 1,650 | Steel (hard) | 2,570 |
| Silver | 1,733 | Steel (mild) | 2,687 |
| Gold | 1,913 | Tin | 446 |
| Iron cast) | 1,920 to 2,012 | Zinc | 779 |
| Iron (wrought | 2,912 | Copper | 1,929 |
| Lead | 612 | | |

## SHRINKAGE OF CASTINGS.

From Pattern Maker's Rule.

| | |
|---|---|
| Aluminium, Brass, Copper, Zinc | 3/16in. |
| Cast Iron, and Lead | $\frac{1}{8}$in. |
| Tin | 1/12in. |
| Steel | $\frac{1}{4}$in. |

**Weight of Metals.**—To find the weight in lbs. multiply the cubical inches of zinc by 25, cast iron, tin or white metal by 26, wrought iron or steel by 28, brass by 30, copper or gun metal by 31, lead by 41 ; cut off two figures to the right, the remainder will be lbs.

TABLE *of the Weight of a Superficial Foot of various Metals, in the*

| Names. | Thickness by the Birmingham Wire Gauge. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| Iron ..... | 12.50 | 12.00 | 11.00 | 10.00 | 8.74 | 8.12 | 7.50 | 6.86 | 6.24 | 5.62 | 5.00 | 4.38 | |
| Copper ... | 14.50 | 13.90 | 12.75 | 11.60 | 10.10 | 9.40 | 8.70 | 7.90 | 7.20 | 6.50 | 5.80 | 5.08 | |
| Brass ... | 13.75 | 13.20 | 12.10 | 11.00 | 9.61 | 8.93 | 8.25 | 7.54 | 6.86 | 6.18 | 5.50 | 4.81 | |
| | Thickness by the Birmingham Wire Gauge. | | | | | | | | | | | | |
| | 13 | 14 | .15 | 16 | 17 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | |
| Iron ..... | 3.75 | 3.12 | 2.82 | 2.50 | 2.18 | 1.86 | 1.54 | 1.25 | 1.00 | 0.80 | 0.64 | 0.50 | |
| Copper ... | 4.34 | 3.60 | 3.27 | 2.90 | 2.52 | 2.15 | 1.78 | 1.45 | 1.16 | 0.92 | 0.74 | 0.58 | |
| Brass ... | 4.12 | 3.43 | 3.10 | 2.75 | 2.40 | 2.04 | 1.69 | 1.37 | 1.10 | 0.88 | 0.70 | 0.55 | |
| | Thickness, in parts of an inch. | | | | | | | | | | | | |
| | $\frac{1}{16}$ | $\frac{1}{8}$ | $\frac{3}{16}$ | $\frac{1}{4}$ | $\frac{5}{16}$ | $\frac{3}{8}$ | $\frac{7}{16}$ | $\frac{1}{2}$ | $\frac{5}{8}$ | $\frac{3}{4}$ | $\frac{7}{8}$ | 1 | |
| Iron ..... | 2.5 | 5. | 7.5 | 10. | 12.5 | 15. | 17.5 | 20. | 25. | 30. | 35. | 40. | |
| Copper ... | 2.9 | 5.8 | 8.7 | 11 6 | 14 5 | 17.4 | 20.3 | 23 2 | 28.9 | 34.7 | 40.4 | 46.2 | |
| Brass ... | 2.7 | 5.5 | 8.2 | 10.9 | 13.6 | 16.3 | 19.0 | 31.3 | 27.1 | 32.5 | 37.9 | 43 3 | |
| Lead ... | 3.7 | 7.4 | 11.1 | 14.8 | 18.5 | 22.2 | 25.9 | 29 6 | 37.0 | 44 4 | 57.8 | 59.2 | |

## SHEET COPPER.

Present Market Price, £90 per ton.

*Per square foot.*

| Size of Sheets | 6ft. x 3ft. | | 6ft. x 4ft. | |
|---|---|---|---|---|
| Gauge | 28 | 26 | 24 | 22 |
| Approx. Weight, | 12oz. | 15oz. | 1lb. 2oz. | 1lb. 7oz. |
| Price per lb., cut | 1/4 | 1/3 | 1/3 | 1/3 |

| Size of Sheets | 6ft. x 4ft. | | | |
|---|---|---|---|---|
| Gauge | 20 | 18 | 16 | 14 |
| Approx. Weight | 1lb. 12oz. | 2lb. 4oz. | 3lb. | 3lb. 12oz |
| Price per lb., cut | 11d. | to | | 1/3 |

## BAR COPPER.

£80 per ton.

| Round— | $\frac{1}{4}$ | $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{5}{8}$ to 1$\frac{1}{2}$ in. |
|---|---|---|---|---|
| By the Bar | 1/5 | 1/3 | 1/2 | 1/1 lb. |
| Cut Bars | 1/7 | 1/4 | 1/3 | 1/2 lb. |

Square, 1$\frac{1}{4}$, 1$\frac{1}{2}$, 1$\frac{3}{4}$ inches—
By the Bar, 1/1 ; Cut Bars, 1/2 per lb.

## TINNED STEEL SHEETS.

Best Charcoal Finish.

6ft. long x 2ft., 2$\frac{1}{2}$ ft., 3ft. wide.

20 gauge, per cwt., 38/– ; per lb. .. .. .. .. 0 4$\frac{1}{2}$
22, 24 and 26 gauge, per cwt., 40/– ; per lb. .. .. .. 0 5

## COPPER CORD.

**For Window Sash Line, Hot Houses, &c.**

| Copper Cord. | Circumference. | Working Load. | Price, 100 ft. |
|---|---|---|---|
| No. 1 | 1$\frac{1}{8}$ inch | 336lbs. | 60/– |
| No. 2 | 1 ,, | 224 ,, | 40/– |
| No. 3 | $\frac{3}{4}$ ,, | 168 ,, | 30/– |
| No. 4 | $\frac{5}{8}$ ,, | 112 ,, | 25/– |
| No. 5 | $\frac{1}{2}$ ,, | 75 ,, | 15/– |
| No. 6 | $\frac{3}{8}$ ,, | 50 ,, | 12/6 |
| No. 7 | $\frac{1}{4}$ ,, | 34 ,, | 10/– |

## SHEET BRASS.

Size of Sheets, 4 feet x 2 feet.

| Gauge | 28 | 26 | 24 | 22 | 20 |
|---|---|---|---|---|---|
| Approx. Weight, sq. ft. | 11oz. | 14oz. | 1lb. 1oz. | 1lb. 6oz. | 1lb. 11oz. |
| Price per lb. cut | 1/3 | 1/2 | 1/1 | 1/1 | 1/1 |

| Gauge | 18 | 16 | 14 | 12 |
|---|---|---|---|---|
| Approx. Weight per ft. | 2lb. 1oz. | 2lb. 12oz. | 3lb. 8oz. | 4lb. 13oz. |
| Price per lb., cut | 10d. | to | | 1/1 |

## SHEET ZINC.

### Plain Sheets.

Size of Sheets, 7ft. x 3ft.

| 6 | 7 | 8 | 9 | 10 | 12 gauge |
|---|---|---|---|---|---|
| 3/- | 3/6 | 4/- | 4/6 | 5/3 | 6/9 sheet |

### Perforated.

Sheets, 7ft. x 3ft. x 8 hole x 7 gauge, 3/6 per sheet, or 2d. per sq. foot.
Ditto. do. $\frac{1}{4}$ hole x 14 gauge, 8/6 per sheet, or 5d. per sq. foot.

ZINC GAUGES AND WEIGHTS.

| Zinc Gauge | Ounces per square Foot. | Approximate Weight per Sheet. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 x 2·8 | | 7 x 3 | | 8 x 2·8 | | 8 x 3 | |
| | | lbs. | ozs. | lbs. | ozs. | lbs. | ozs. | lbs. | ozs. |
| 4 | abt. 5 | 5 | 13 | 6 | 9 | 6 | 11 | 7 | 8 |
| 5 | ,, 6 | 7 | 0 | 7 | 14 | 8 | 0 | 9 | 0 |
| 6 | ,, 7 | 8 | 3 | 9 | 3 | 9 | 5½ | 10 | 8 |
| 7 | ,, 8 | 9 | 5 | 10 | 8 | 10 | 10 | 12 | 0 |
| 8 | ,, 9½ | 10 | 8 | 11 | 13 | 12 | 0 | 13 | 12 |
| 9 | ,, 11 | 12 | 13 | 14 | 7 | 14 | 11 | 16 | 8 |
| 10 | ,, 13 | 15 | 3 | 17 | 1 | 17 | 5 | 19 | 8 |
| 11 | ,, 15 | 17 | 8 | 19 | 11 | 20 | 0 | 22 | 8 |
| 12 | ,, 17 | 19 | 13 | 22 | 5 | 22 | 11 | 25 | 8 |
| 13 | ,, 19½ | 22 | 12 | 25 | 9½ | 26 | 0 | 29 | 4 |
| 14 | ,, 22 | 25 | 11 | 28 | 14 | 29 | 5 | 33 | 0 |
| 15 | ,, 24 | 28 | 0 | 31 | 8 | 32 | 0 | 36 | 0 |
| 16 | ,, 26 | 30 | 5 | 34 | 2 | 34 | 11 | 39 | 0 |
| 17 | ,, 30 | 35 | 0 | 39 | 6 | 40 | 0 | 45 | 0 |

Mem.—If sheet zinc contains any *iron* in its composition, it will not resist the action of the air, and is no better than damaged or inferior galvanised iron. It is essential that it should be perfectly malleable, or it will crack with too sudden changes of temperature ; the best test of its malleability is to double the corners backwards and forwards, which ought not to crack it.

Care must be taken to allow for *contraction* and *expansion*, which may be effectually guarded against if properly laid.

**Good sheet zinc** forms an excellent *cheap substitute* for lead or copper in the lining of tanks, cisterns, urinals, gutters, or for covering ridges, hips, flats, &c., and is largely used in Europe.

**Galvanised Iron** (No. 24 gauge) valley gutters were used in the King-street Arcade, Sydney. They are about 18in. wide, with regular fall and no drips, the down pipes being at short intervals ; the sheets were soldered together in one length of about 80 feet, which is not secured so that it can expand ; the flashings are also of galvanized iron. Similar work is said to be common in Queensland.

**Labour to zinc** and galvanized iron is about the same.

## VENTILATORS.

**Stamped and Cast Zinc.**

Louvre Vents, Cast 9″ x 6″ .. 16/6 per doz. 9″ x 3″ 11/3
Open Vents, 12″ x 6″, 1/6 each. Grating, 15″ x 6″, each 2/6
Hit or Miss Vents, stamped, with box, 9″ x 6″, 16/6 per doz. ; 9″ x 3″, per doz. .. .. .. .. .. .. 13/6
Circular H. or M. Vents, 12″ dia., 3/6 ; 14″ dia. .. .. 3/9
Flap Vent, with pulley 9″ x 6″ .. .. .. .. .. 5/–

## HALF ROUND ZINC LETTERS FOR SIGNS, &c.

| Height .. | 6″ | 9″ | 12″ | 15″ | 18″ | 24″ | 36″ | 48″ |
|---|---|---|---|---|---|---|---|---|
| Each .. | 1/2 | 1/8 | 2/6 | 3/– | 5/– | 10/– | 25/– | 40/– |

**Capitals and Bases,** for 2½″ columns, each from .. .. .. 7/6
**Embossed Consoles,** from .. .. .. .. .. .. 5/–

## ZINC FIGURES, STATUES, &c.

Bronzed Eagle .. .. .. .. .. .. .. £5 10/–
" Minerva," " Mercury," &c., quotations according to size. *See* advt. pages 2 and 27.

## ZINC GLAZING BARS.

Waterproof, fitted with capping, straight, per lineal ft. 1/5 and 1/9
Ditto do. stepped, per foot .. .. .. .. 2/–
Brass attachments, shoe and head, per set .. .. .. 1/5

## ZINC ROOFING.

In Sheets, 6′10″ x 2′10″ wide—Per square yard.

**Zinc Fish-scales,** small pattern, 4″, 6/6 ; 5½″, 6/9 ; 7½″ 7/–
**Interlocking Zinc Roofing Tiles**—
100 to 150 to the square of 100 super ft., per square, 63/– to 75/–
**Roof Ridges and Crestings,** 12 per foot run.. .. 1/9 to 2/10
**Eaves, Cornice** 24″ high x 15″ projection, per foot run.. .. 3/–
Zinc Skylight, to any size fixed light, per sq. ft., 1/9 ; hinged .. 2/9

Zinc **Sash Bar** with **T iron,** 1¼″ x 1¼″ x ⅜″, per foot run .. .. 1/9
12in. semi-cir. **Louvre Ventilator,** 18″ long, with flashing, each 30/–
Lunettes, or Window Facings, for Mansard roofs, 36″ x 20″ opening, each .. .. .. .. .. .. .. 70/–

(*See also* **Glazing Bars,** Index Glazing.)

## ZINC FINIALS.

| **Height** .. .. .. | 21″ | 24″ | 30″ | 36″ |
|---|---|---|---|---|
| Price, from .. .. | 15/– | 20/– | 25/– | 32/6 |

| Ceilings— | Material only per square yard. | Labour Fixing Ceilings, including battens. |
|---|---|---|
| Diapers .. .. | 1/10 to 2/3 | from 2/– per sq yd. |
| Panelling .. .. | 2/2 to 2/9 | ,, 2/6 |
| Panels .. .. | From 4/– | ,, 3/6 |

**Cornices, &c.—**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Border Finishes** | width | 5″ | 6″ | 8″ | 9″ | 12″ |
| | Price, per foot | 3d. | 3½d. | 4d. | 4½d. | 6¾d. |
| **Cornices** | girth | 3″ | 6″ | 9″ | 12″ | 15″ 18″ |
| | Price, per ft. | 1½d. | 2¾d. | 4d. | 5d. | 6¾d. 7½d. |
| **Borders,** | width | 6″ | 9″ | 12″ | 18″ | 24″ |
| | Price, per foot | 2½d. | 3½d. | 4½d. | 6d. | 8d. |
| **Friezes** | width | 6″ | 9″ | 12″ | 18″ | 24″ |
| | Price, per foot | 2½d | 3½d to 5d | 4½d to 7d | 6d to 10d | 8d to 11d |

**Mitre Leaves, Corners,** from 5d., 9d., 1/3 to 2/4

**Labour,** Fixing Cornices, including Bracketing, 2d to 6d. per foot run, according to girth.

## STEEL WALL LINING, DADOS, &c.

| | | | |
|---|---|---|---|
| **Dados,** height .. .. | 2′6″ panel. | 3′0″ panel. | 4′0″ plain. |
| Price, per foot run .. | 10d. | 10d. to 1/– | 10d. |
| **Neck Mouldings,** per lineal foot, from | 2½d. to 6d. | | |
| **Dado Cappings,** per lineal foot, from | 2½d. to 6d. | | |

## METAL ENCASED MOULDINGS FOR SHOP FRONTS.

**White Metal, " Silverite," Bronze Copper, and Brass.**

(Up to 12 ft, lengths.)

| | | |
|---|---|---|
| Size ¾″ circle bead, per foot run .. .. .. .. .. | 0 | 10 |
| Size ¾″ circle bead, dou. rabetted, per foor run .. .. .. | 0 | 10 |
| 1″ dia. ,, ,, .. .. .. | 1 | 2 |
| 1½″ dia. ,, ,, .. .. .. | 1 | 9 |
| 2″ dia. ,, ,, .. .. .. | 2 | 6 |
| 2¾″ dia. ,, ,, .. .. .. | 3 | 0 |
| Angle or base, quarter round, 1½″, 1/3 ; 1⅞″ .. .. .. | 1 | 6 |
| O.G., 3″ x 2″, for side mould shop window .. .. .. | 3 | 6 |
| Centre Sash, double lambs' tongue, 3″ x 3½″, per foot .. .. | 3 | 6 |
| Side Sash, single lamb's tongue, per foot .. .. .. | 2 | 6 |
| Sill or Cornice mould, 2½″ x 1½″, per foot .. .. .. .. | 2 | 5 |

**Caps and Bases, &c.—**

| | | |
|---|---|---|
| Plain caps and bases, for 2in. dia. bar, each .. .. .. | 5 | 6 |
| Ornamental caps and bases, for 2″ dia. bars, each .. .. | 8 | 0 |
| Ditto do. 3½″ dia. bars, each .. .. .. .. | 10 | 6 |
| Stamped egg and dart mould, 2″ dia., per foot .. .. .. | 2 | 6 |
| Torus, ovolo, O.G., scotias beads, and other moulds— | | |
| Per inch per foot, to 2″, 9d ; to 3″, 8d. ; to 4″ .. .. | 0 | 7 |

Zinc moulds, 10% less than above.

For further information, see advt., 2, 11, 14, and 27 pages.

## SHOP WINDOW FIXED COMPLETE.

**Copper, Bronze, Brass, or Nickel columns, for shop fronts,** 2in. dia., up to 18 feet long, with caps and bases, fixed complete, each .. .. .. .. .. .. .. 3 0 0

**Brass Metal boards,** for foot of show windows, 9″ wide, per lineal foot, from .. .. .. .. .. 10 0 to 150

For further information, see advt., pages 14 and 11.

## BRASS AND COPPER.

| | s. d. | s. d. |
|---|---|---|
| Brass or bronze casting , per lb. .. .. .. .. | 1 6 to | 1 8 |
| Cast copper cramps, or other castings, do. per lb. .. | 1 4 to | 1 6 |
| Sheet and bolt copper, per lb. .. .. .. .. | 1 4 to | 1 6 |
| Copper tubes, ⅛″ thick, as below, per lb. .. .. .. | 1 6 to | 1 9 |

**Muntz Metal,** per foot sup., 16, 18, and 20 oz., sheets 4ft. by 14in., per lb. .. .. .. .. .. 0 7½ to 1 0

| | | |
|---|---|---|
| Ditto, bolts and straps, at Sydney, per lb. .. .. | 0 11 to | 1 0 |
| Zinc rosettes, per lb. .. .. .. .. .. | 1 0 to | 1 4 |
| Ditto, friezes, finials, &c. .. .. .. .. .. .. | | 1 0 |

N.B.—The weight of a brass or bronze casting will be 3¾ times the weight of a similar plaster of Paris casting.

**Spun Metal Balusters—**

| | |
|---|---|
| 16 inches x ¾″ square .. .. .. .. .. | 18/– |
| 24 inch x 1″ square .. .. .. .. .. .. | 23/– |
| **Stamped Copper and Bronze Reposse Work** in Floral and other designs, according to design, per ft. .. .. .. .. | 10/– |
| **Name Plates,** finger plates, 24″ x 6½″, each .. .. .. | 45/– |

## STAIR TREADS.

| | |
|---|---|
| **Stair Tread,** polished corrugated brass, drawn, and nosing protector, per ft. run .. .. .. .. .. .. | 2/ |
| **Stair Tread,** cast brass chequered .. .. .. .. .. | 1/3 |
| Ditto, with polished nose, 1/6, filed .. .. .. .. | 1/9 |
| Brass Stair Rods, 21″ to 30″ long, per doz. .. .. | 2/3 to 3/– |
| Eyes, to suit, per doz. .. .. .. .. .. | 6d. & 8d. |
| Triangular Brass, 27″ x ¾″, per doz. .. .. .. .. | 21/– |
| Eyes to suit, per doz. .. .. .. .. .. | 4/– to 5/6 |
| Ditto, 27″ x 1″, per doz. .. .. .. .. .. | 35/– |

## GAL. ROCK-FACED SHEETING.

**Suitable for Garden Walling, etc.** Material, per sq. yard.

| | |
|---|---|
| Painted and sanded .. .. .. .. .. | 6/– to 6/6 |
| **Brick Sheeting,** per sq. yard .. .. .. .. .. | 2/4 |

Labour, fixing from 6d. per yard.

## LIGHTNING CONDUCTORS.

Market Price of Copper, £90 per ton.

| | £ | s. | d. |
|---|---|---|---|
| Lightning Conductors, **tape,** 1¼″ x ⅛″, per 100 ft. | 5 | 0 | 0 |
| Ditto. do. do. rope ½″ dia.. per 100 ft. | 5 | 5 | 0 |
| Elevating **tube** and **terminals,** complete | 1 | 17 | 6 |
| Copper **Earth Plate,** 24″ x 12″ x ⅛″, each | | 15 | 0 |
| **Lightning Arresters,** Automatic, each | 1 | 10 | 0 |
| Plain solid **copper point,** with coupling for rope end, and copper elevating tube, 4ft. long | 1 | 10 | 0 |
| Solid copper point, with 3 attractors, 3″ Holdfast for passing along slated roof, per doz. | 0 | 10 | 6 |
| Copper holdfast clips, each 6d. Insulators, each | 0 | 1 | 0 |

In using copper tubes or hollow balls it is necessary that all points of junction or contact should be sweated or soldered so that the inside cannot be impaired by dust or dirt.

**Labour, fixing,** from, per foot run .. .. .. 0 6 to 0 8

## GUN AND MUNTZ METAL.

Per lb. including patterns and fixing.

| | s. | d. |
|---|---|---|
| Gun metal to top railing and curved balusters of lighthouse | 1 | 6 |
| Ditto casements about 30lbs. each, size 24″ x 12″ | 2 | 0 |
| Ditto sluice valves to sewer pipes | 1 | 9 |

## SHEATHING PILES.

| | | |
|---|---|---|
| Sheathing piles with 20 oz. muntz metal to 18″ below rock on planted piles, and 6ft. below ground on driven piles, including 1½″ muntz metal nails for ditto, ¾lbs. to each sheet, size of sheets, 48″ x 14″ | 1 | 3 |
| Fixing No. 20 gauge muntz metal, round piles from 10 to 20 feet under water, including nails, as before | 2 | 0 |

## DIVER.

N.B.—The charge for a diver and two attendants, including all necessary apparatus, is £3 to £4 per day from 9 a.m. to 4 p.m. A diver will nail on to piles about 14 sheets of muntz metal per day.

**Diving apparatus,** complete in the Australian cities, from £135 to £175.

For the weight of muntz metal sheets, reckon the same weight as brass. *See* Index.

### Cement for Iron Pipe Joints.

Ten pounds of ground litherage, best quality, four pounds of best Paris whiting, one-half a pound of yellow ochre, two pounds of dry red lead, one-half an ounce of hemp cut in half-inch lengths ; mix well with boiled linseed oil to the consistency of thick putty ; make joints in usual way. The above mixture will set quick when heat is applied. It repairs boilers, resists fire, and will set in water.

# WIRE WORKER.

Woven sheets less than 4ft. super. are charged by the piece, widths of less than 1ft. are charged as 1ft.

List prices are reckoned at the present price of wire ; but for general use as a guide, the quotations are as under.

Fixing to be added.

## STRAIGHT WIRE LATTICE.

PER FOOT SUPER.

| Size of mesh. | GALVANISED. No. 15 gauge. | No. 14 gauge. | No. 13 gauge. | PLAIN IRON. No. 15 gauge. | No. 14 gauge. | No. 13 gauge. |
|---|---|---|---|---|---|---|
| ¼inch | 9d. | 11d. | 1/– | 8d. | 10d. | 11d. |
| ⅜inch | 7½d. | 8½d. | 9d. | 6½d. | 7½d. | 8½d. |
| 7/16inch | 6½d. | 7½d. | 8d. | 5½d. | 6½d. | 7½d. |
| ½inch | 5d. | 6d. | 7d. | 4d. | 5d. | 6d. |
| ⅝inch | — | 5d. | 6d. | — | 4d. | 5d. |
| ¾inch | — | — | 5d. | — | — | 4d. |

## CRIMPLED WIRE DIAMOND LATTICE.

PER FOOT SUPER.

Galvanised or Painted.

| Size of Mesh. | No. 14 gauge. | No. 13 gauge. | No. 12 gauge. | No. 11 gauge. | No. 10 gauge. | No. 9 gauge. |
|---|---|---|---|---|---|---|
| 1 inch .. | 4d. | 5d. | 6d. | 8d. | 9d. | — |
| 1½ inch .. | 3½d. | 4½d. | 5d. | 6½d. | 7d. | — |
| 2 inch .. | 3d. | 4d. | 4½d. | 5½d. | 6d. | 8d. |
| 2½ inch .. | 2½d. | 3d. | 3½d. | 4½d. | 5d. | 7d. |
| 3 inch .. | 2d. | 2½d. | 3d. | 3½d. | 4d. | 6d. |
| 4 inch .. | — | 2d. | 2½d. | 3d. | 3½d. | 5d. |
| 6 inch .. | — | 1d. | 2d. | 2½d. | 3d. | 4½d. |

## BRASS WIRE LATTICE.

PER FOOT SUPER.

| Size of Mesh. | No. 15 gauge. | No. 14 gauge. | No. 13 gauge. | No. 12 gauge. | No. 11 gauge. | No. 10 gauge. |
|---|---|---|---|---|---|---|
| 1 inch .. | 1/7 | 1/8 | 1/10 | 2/– | 2/3 | 2/6 |
| 1½ inch .. | 1/4 | 1/5 | 1/6 | 1/8 | 1/10 | 2/– |
| 1¾ inch .. | 1/3 | 1/4 | 1/5 | 1/6 | 1/8 | 1/10 |
| 2 inch .. | — | 1/1 | 1/2 | 1/3 | 1/5 | 1/8 |
| 2½inch .. | — | — | 11d. | 1/– | 1/3 | 1/6 |

For further information, see advt., page 11.

## GALVANIZED WIRE NETTING.

ROLLS 50 YDS EACH. Prices liable to fluctuation.

| Mesh. | gauge. | 2ft. | 3ft. | 4ft. | per sup. ft. |
|---|---|---|---|---|---|
| ½ inch | 20 | 25/– | 37/6 | 50/– | 4d. |
| ¾ inch | 20 | 12/6 | 18/9 | 25/– | 2½d. |
| 1 inch | 19 | 11/3 | 16/– | 22/– | 1¾d. |
| 1½ inch | 18 | 9/– | 13/6 | 18/– | 1½d. |
| 2 inch | 18 | 7/– | 10/6 | 14/– | 1¼d. |

**WOVEN WIRE (Various).**

**Extra Strong Wire Screen Work,** 14 x 14 mesh, 1/– per square foot. (*See* advt., Shaw & Son.)

GALVANISED WOVE WIRE.

24 inches wide.

10 to 16 meshes to inch, 6½d. per foot run.
4 to 10 meshes to inch, 6d. per foot run.

BRASS WOVE WIRE.

24 inches wide.

18 to 30 meshes to inch, 11d. to 1/–. 36, 40, 50, 60 meshes to inch.
Price .. 1/1 1/3 1/6 1/9 per foot run.

**Wire Gauze for Fly Doors and Windows.**

**Galvanised, American**—
24 mesh, 8d. ; 30 mesh, 10d. ; 36 mesh, 1/– ; 42 mesh, 1/3 per yd.

**Galvanised, English Heavy**—
24 mesh, 6½d. ; 30 mesh, 8d. ; 36 mesh, 9½d. ; per foot.

**Brass, English**—
24 mesh, 9d. : 30 mesh, 11½d. ; 36 mesh, 1/2 per foot run.

WOVEN WIRE FENCE.

Constructed in *situ* by Cyclone Weaver.

Machine Complete, £7/10/–. or hired out for small contracts.
Gal. Cyclone loops, 6d. per lb., of 200.
Gal. Staples, 1½″, 2½d. per lb. ; 1000 in 16lbs.
*Note.*—Posts can be 22 feet apart.

**The Anchor Clamp Wire Fence,** is formed of horizontal and upright wires securely fastened together at junctions by wrought iron clamps. A special clamp pincher is used to crimp the wires and close the clamp.

These ornamental wire fences and gates are also used for suburban properties, being durable, light and effective.

ORNAMENTAL WIRE FENCES.

Made with " Anchor " Patent Clamps.

Anchor Clamps (Black), 12/– ; (Galv.), 14/6 per 1000 = 17lbs.
Automatic Ratchets, 6/– ; (Galv.), 8/– per doz. = 13lbs.
Anchor Clamp Pinchers, 20/– each = 7lbs.

| Mesh inches. | No. Horizontal Rods. | Weight per 100 feet. | Height. | Cost per Running foot. |
|---|---|---|---|---|
| 3 x12 or | 3 | 118lbs. | 30″ | 1/1 |
| 3 x 15 | 3 | 134lbs. | 36″ | 1/2 |
| 6 x 6 | 5 | 92lbs. | 30″ | 8d. |
| | 6 | 109lbs. | 36″ | 9½d. |
| | 7 | 126lbs. | 42″ | 11d. |
| Top 6 x 6 | 5 | 118lbs. | 30″ | 1/2 |
| bottom | 6 | 150lbs. | 36″ | 1/5 |
| 3 x 6 | 7 | 167lbs. | 42″ | 1/8 |
| 2 x 6 | 5 | 206lbs. | 30″ | 1/11 |
| | 6 | 244lbs. | 36″ | 2/4 |
| | 7 | 282lbs. | 42″ | 2/9 |

## WIRE STRAINERS.

| | | | |
|---|---|---|---|
| Rennies, each .. .. | 15/– | Walker's, per doz. .. | 3/6 |
| Titan, each .. .. .. | 15/– | Triplex, per doz. .. | 7/6 |
| Norton, each .. .. | 9/6 | Galvanised, 4in., 1/6 ; | |
| Donald's, each .. .. | 15/– | 6in., per doz. .. | 2/– |
| Page's, each .. .. .. | 16/6 | Ewen's, per doz. .. | 3/9 |
| Federal Splicer, per 100 .. | 25/– | Levers, each .. | 3/6 |

## SPACING TABLE.

### NUMBER OF POSTS PER MILE.

| Distance apart | 10ft. | 12ft. | 14ft. | 16ft. | 18ft. | 20ft. | 22ft. |
|---|---|---|---|---|---|---|---|
| Posts required | 528 | 440 | 378 | 330 | 293 | 264 | 240 |

### Example of how to Estimate Cost of Fencing.

Approximate Costs per mile of girder steel fencing, consisting of five plain wires and one barb, with standards 21 ft. apart, and two droppers between each standard. Height of fence, 3ft. 9in.

| Appx. weight. Cwt. | q. | lbs. | | Melbourne. £ | s. | d. |
|---|---|---|---|---|---|---|
| 15 | 0 | 0 | 240 Steel Girder Posts, 5′6″ long, 125/– per 100 .. | 15 | 0 | 0 |
| 3 | 0 | 0 | 10 do. Straining Posts, with sole pieces, 6/– each | 3 | 0 | 0 |
| | 2 | 0 | 4 do. do. Stays, with ground plates, 5/– .. | 1 | 0 | 0 |
| 6 | 2 | 0 | 480 do. do. Droppers, 30/– .. .. | 7 | 4 | 0 |
| 16 | 0 | 0 | 16 Cwt No. 8 Black Wire, 8/6 .. .. .. | 6 | 16 | 0 |
| 4 | 0 | 0 | 4 Cwt No. 12 Barb Wire, 13/– .. .. .. | 2 | 12 | 0 |
| | | | Labour, erecting, 1/– per chain .. .. .. | 4 | 0 | 0 |
| 45 cwt. | | | | 39 | 12 | 0 |
| | | | Carriage to be added at say 20/– per ton .. | 2 | 5 | 0 |
| | | | | £41 | 17 | 0 |

For wooden or other posts, if used, leave out the first three items, and add cost.

## WEIGHT OF FENCING WIRE.

(Ironmonger's List.)

| Gauge Number. | Weight Per Mile. | Yards Per Cwt. | Break'g Strain. | Weight of Fence Per Mile for 2 Wires. | 3 Wires. | 4 Wires. | 5 Wires. |
|---|---|---|---|---|---|---|---|
| | lbs. | yards | lbs. | c. q. lbs. | c. q. lbs. | c. q. lbs. | c. q. lbs. |
| 4 | 714 | 276 | 2197 | 12 3 0 | 19 0 14 | 25 2 0 | 31 3 14 |
| 6 | 495 | 397 | 1528 | 8 3 10 | 13 1 1 | 17 2 20 | 22 0 11 |
| 8 | 344 | 573 | 1060 | 6 0 16 | 9 0 24 | 12 1 4 | 15 1 12 |
| 10 | 241 | 819 | 741 | 4 1 6 | 6 1 23 | 8 2 12 | 10 3 1 |
| 12 | 142 | 1393 | 436 | 2 2 4 | 3 3 6 | 5 0 8 | 6 1 10 |

**Steel Barbed Wire,** 3in. spaced—

| Gauge No. | Wght. per Mile. c. q. lbs. | Yds. per cwt. | Price per Ton £ s. d. | Price per Mile. £ s. d. |
|---|---|---|---|---|
| 14 | 2 0 19 | 810 | 20 10 0 | from 2 4 6 |
| 12 | 2 3 15 | 610 | 19 0 0 | |

ELECTRIC TELEGRAPHS.—Labour.—Per Mile.

| | £ | s. | d. |
|---|---|---|---|
| **Erecting iron poles** and one wire (labour only), near Sydney or Melbourne .. .. .. .. .. .. | 5 | 0 | 0 |
| Fixing extra wire on ditto .. .. .. .. .. .. | 1 | 7 | 0 |
| Ditto, stays and struts, extra, each .. .. .. .. | 0 | 5 | 0 |

Wooden telegraph poles will cost about the same as the timber for rough timber bridges, with the cartage added. *See* Index.

## PATENT GATES, &c.

### DRIVEWAY GATE.

**Suitable for Entrances or Public Roads.**

Tubular iron frames, for opening out of a vehicle, with intermediate bars and braces of solid iron.

All joints screwed together.

The braces are double, being cleated between each bar.

| | | | |
|---|---|---|---|
| 10ft. Gate, $1\frac{1}{4}$ framing, 7/16 intermediate bars and braces, including all attachments for opening out of a vehicle, from £4 to .. .. .. .. .. .. .. | 5 | 10 | 0 |
| 10ft. Gate, 1in. framing, $\frac{3}{8}$ intermediate bars and braces, including all attachments for opening out of a vehicle .. | 5 | 0 | 0 |

These attachments can be fixed to any gate already erected.

### THE " OTTO " PATENT GATE OPENER.

| | | | |
|---|---|---|---|
| Tubular gate, 10 x 4ft., all gear complete, £4 to .. .. | 6 | 0 | 0 |

### THE McNEILL-CARTER PAT. AUTOMATIC GATE MANIPULATOR.

| | | | |
|---|---|---|---|
| Fittings can be applied to any gate of " Cyclone " pattern and manufacture, fittings, complete .. .. .. .. | 2 | 5 | 0 |

### N.Z. AUTOMATIC CLOSING GATES

| | | | |
|---|---|---|---|
| By passing of wheel over raised iron lever the gate swings away, and closes when other lever is released by wheel passing over corresponding lever at the other side of gate (Buzacott & Co.). Prices, fittings, from .. .. .. .. | 3 | 0 | 0 |

## SINGLE AND DOUBLE
## IRON-TUBE FRAMED RESIDENCE GATES.

ORNAMENTAL PATTERNS.

Prices Unhung ; including all Hangings and Fastenings.

3ft. Opening, £1/–/– ; 3ft. 6in., £1/2/6 ; 4ft., £1/5/–.

9in. Single Opening, £2/10/–.

12ft. Double Opening, £3/5/–.

Built of Iron Tubing, 1″ outside diameter ; filled with 6″ x 3″ wire mesh, secured with clips.

Wood bound and plain gates, half prices.

Height, 4ft. ; weight, 9lbs. per lineal foot.

An 8ft. gate — 72lbs.

## HUME BROS.' PAT. STEEL ROLLED ORNAMENTAL
## FENCES, GATES, FRIEZES, BRACKETS, &c.

Manufactured in Adelaide.

Fences from 17″ to 48″, per foot run, fixed, 2/9 to 5/6.

Gate, 3ft. 3in., included in 30ft. run of same height of fence. Painted three coats any colour.

Ornamental gates, from 20/–. Posts, from 9/–pair. Brackets, from 5/–. Friezes and crests, from 1/– per foot run.

For further particulars, see local agent.

## DROPPER WIRE FENCING.
## GIRDER STEEL POSTS AND DROPPERS.

Pettits Patent, Geelong, Victoria.

### Material for Fence Contractors.

A 6-wires Fence, 1 barbed, complete, costs about £42 per mile.

| | On wharf. |
|---|---|
| 280 to the ton weight, 5ft. 6in. long, size $1\frac{1}{2}$ x $\frac{3}{4}$, punched, for wires and slot at top for barb, per 100 .. .. .. | £6 10 0 |
| 224 to the ton, 5ft. 6in. long, size $1\frac{1}{2}$ x 1, punched for wires and slot at top for barb, per 100 .. .. .. .. .. | 7 15 0 |
| Straining Posts, including solo pieces, each .. .. .. .. | 0 6 0 |
| Stays, with ground plates, each .. .. .. .. .. | 0 5 0 |

### FENCE DROPPERS (Various).

The standard gauge to which posts and droppers are punched is for six wires (reading from the ground upwards, including barb), 6,5,5,6,8,12 — 42 inches to top wire.

| | | | |
|---|---|---|---|
| **Steel Girder Dropper**— | | | |
| 30in. long, punched for wires, and slot at top for barb .. .. | 1 | 7 | 6 |
| " **King-loc** " dropper, 30in. — 87lbs. per 100 .. .. .. | 1 | 4 | 0 |
| Extra strong do. 45in. — 132lbs. per 100 .. .. | 1 | 10 | 6 |
| **Page's** Simple **Dropper,** 22in. — 40lbs. per 100 .. .. .. | 0 | 10 | 0 |
| 7-tongue do. do. 42in. — 75lbs. per 100 .. .. | 0 | 16 | 8 |

**Post boring** and morticing machines with chisels and bits, £20. Post boring apparatus, 38s. to 50s. Fencing braces, all iron, 6s. each. Wire straighteners, 8s. to 25s. each. Earth borers, for fencing posts, 3 sizes, viz. :—7 inch, 21s. ; 9 inch, 25s. ; and 12 inch, 40s.

# ELECTRICAL.

The Prices under this heading are based on the 12½% **Import Duty,** so any alteration in rate must be allowed for.

A brief explanation of some of the **Electrical terms** commonly used will be found useful to readers :—

**Current** denotes the **flow** of Electricity along a conductor.

**Volt** is the unit of **Electro motive force,** E.M.F., the force or pushing power.

**Ampere.**—The quantity of current flowing through, or the rate at which electricity passes a given point in the conductor.

**Watt,** or **Volt Ampere,** signifies the value of output being amperes × by volts.

**Ohm.**—The unit of resistance in the conductor tending to impede the flow of current.

**Resistance** is offered more or less by all substances through which electric current passes.

**Insulator.**—All substances which resist the passage of electric current are termed insulators ; such as glass, slate, marble, vulcanite, mica, and india rubber.

**Positive** is signified by the sign + and **Negative** by —.

**Horse-power** = 33,000 foot pounds per minute.

**Brake Horse-power** = the available H.P. at the pulley.

**A Watt** = 1 volt × 1 ampere.

**Electric** H.P. = 746 watts.

**Indicated** H.P. = the calculated H.P. from the mean steam pressure on the piston, *i.e.*, the H.P. put into an engine.

**Nominal H.P.**—A purely arbitrary unit, varying with different makers, hardly ever used now. *See* Index.

## SHUNT WOUND DYNAMOS.

| | 100 or 200 Volts. | | | | | |
|---|---|---|---|---|---|---|
| | Amperes. | | No. of 16 c.p. | | Complete with Rails and | H.P. required to |
| K.W. | 100 volts. | 200 volts | lamps. | R.P.M. | Starter. | drive. |
| 1.4 | 14 | 7 | 23 | 1300 | £24 0 0 | 2 |
| 3.2 | 32 | 16 | 53 | 1300 | £33 0 0 | 4 |

For compound wound machines, add 5%.

For private plants, the improved gas and oil engines are an admirable steady motive power required for lighting.

*See* Index, PLANT AND TOOLS.

## COMBINED PETROL ENGINE DYNAMO SETS.

Dynamos coupled to high speed petrol engine.

| Output of Dynamo. K.W. | Number of 16 c.p. lamps. | Exclusive of Accessories. |
|---|---|---|
| 1.75 | 28 | 75 |
| 3. | 51 | 85 |
| 7. | 116 | 180 |

## MOTORS.

### FOR ALL POWER PURPOSES.

**Continuous Current Shunt Wound,** 100, 240 and 480 **Volts.**

| B.H.P. | R.P.M. | Complete with Rails and Starter. |
|---|---|---|
| ½ | 1600 | £11 0 0 |
| ¾ | 1600 | £13 10 0 |
| 1 | 1600 | £16 0 0 |
| 1½ | 1400 | £18 10 0 |
| 2 | 1100 | £23 0 0 |
| 3 | 1200 | £27 0 0 |
| 4 | 1200 | £33 0 0 |
| 5 | 1500 | £34 0 0 |
| 7½ | 1350 | £41 0 0 |
| 10 | 1300 | £47 0 0 |

## ELECTRIC LIGHTING.

**Indoor lighting** requires according to purpose from 2 to 5 candle power per 10 square feet.

**Outdoor** lighting, ditto, ½ to 2 candle power per 10 square feet.

The **Arc light** is generally adopted in spacious halls, shops, yards and streets.

### ARC LAMPS.

Enclosed Type for Long Burning. Continuous Current.

**Single or double enclosure,** for parallel burning, 100–150 volts.—
4 to 6 amps., complete with line resistance, 100 hours, each £4/15/–
For **Series** burning on 200–250 volts, 5.5 amps., 100 hours, each £5.
For **Parallel** burning on 200–250 volts, double carbon lamp, complete with line resistance—
Single or double enclosure, 3.75 amps., each .. .. £5/5/–
Fancy copper covers for above, extra, each .. .. 10/–

### ALTERNATING CURRENT LAMPS.

**Enclosed Type.**

Will burn singly, or two in series with balancer.
7.5 amps, 100 hours, lamps, each .. .. .. .. .. £5/5/–
Balancer, each .. .. .. .. .. .. .. £2/10/–
**Open Type,** 16 hours, 10 amps.—
To burn two in series, on 100–130 volts, each .. .. £5/–/–
Line resistance for above, each .. .. .. .. 12/6

| **CARBONS.** | s. | d. |
|---|---|---|
| **Carbons,** for open or enclosed types lamp, per pair .. .. (Both Carbons, positive and negative, are the same size). | 0 | 2 |
| Carbons for alternating lamps, per pair .. .. .. .. | 0 | 3 |

### MINIATURE ARC LAMPS—100 c.p.

" **Lilliput** " pattern, low voltage, 10–12 hours, each .. .. 1 10

## INDOOR LIGHTING.

Incandescent Glow Lamps are almost exclusively used for this purpose.

One ordinary 16 c.p. lamp is rated at about 4 watts per c.p.

### INCANDESCENT LAMPS.

| | s. | d. |
|---|---|---|
| Best **English make,** low voltage to 120 volts, 8, 16, and 25 c.p., per doz. .. .. .. .. .. .. .. | 10 | 0 |
| 32 c.p., per doz., 14/– ; 50 c.p., each .. .. .. | 2 | 0 |
| **High Voltage,** to 250 volts— | | |
| 8, 16, and 25 candle power, per doz. .. .. .. | 11 | 0 |
| 32 c.p., per doz. ,15/– ; 50 c.p., each .. .. .. | 2 | 6 |
| **Continental Made Lamps**— | | |
| L.V., 8, 16, 25 and 32 c.p., per doz., 7/6 ; 50 c.p., each.. | 1 | 0 |
| H.V., 8, 16, 25 and 32 c.p., per doz., 8/– ; 50 c.p., each .. | 1 | 3 |
| **High Efficiency Lamps**— | | |
| " Tantalum," 100–120 volts, 25 c.p., each.. .. .. | 3 | 0 |
| " Sunbeam," with shade, 25 c.p., each, 2/– ; 50 c.p., each | 4 | 0 |

**Cost of Installation** from service mains depends on cost of local labour. It averages for ordinary fittings, with wires encased in close joint conduit, wood casing, or brass insulated tubing, 15/– to 25/– per lamp.

Special Prices will be quoted by Warburton, Franki & Co., at any time, free.

Where special encasement is necessary for damp places, or under plaster, screwed conduit is used. Price for wiring only in screwed conduit, about 30/– per lamp.

### FITTINGS.

| | | |
|---|---|---|
| Plain pendant, with ceiling rose, flexible cord, shade and holder, each 2/6 to .. .. .. .. .. .. | 3 | 0 |
| Counter balance pendant, ceiling rose, flexible cord, porcelain counter weight, with shot, fitted with— | | |
| 10″ opal shade and holder, each, from .. .. .. | 4 | 6 |
| 3 light plain spider fitting only, each .. .. .. | 3 | 0 |
| 3 light fancy do. do., each .. .. .. .. | 5 | 0 |
| 3 light fancy pendants, each, from .. .. .. .. | 10 | 0 |

### ELECTROLIERS.

| | | |
|---|---|---|
| 3 light plain brass, 4ft. stem, each, from.. .. .. .. | 25 | 0 |
| 5 light do. do. each, from .. .. .. .. | 40 | 0 |

For copper, bronze, or oxydised silver finish, add 25%.

### WALL BRACKETS.

| | | |
|---|---|---|
| 9″ plain swan neck, ½″ tube, each .. .. .. .. | 1 | 6 |
| 12″ fancy, plain brass, ½″, from .. .. .. .. .. | 4 | 6 |
| Two-light do. do. each .. .. .. .. | 10 | 0 |

### TABLE STANDARDS AND NEWEL LAMPS.

| | | | |
|---|---|---|---|
| 12″ plain standard, with gallery shade and holder, each, from | | 7 | 6 |
| Fancy do. do. fancy shade and holder, each, from | | 12 | 6 |
| Newel standard, 3 light, 4ft. p. brass, 1″ stem, each | 5 | 0 | 0 |
| Bronze figures standard, 12 light, ornamental | 4 | 0 | 0 |
| Ditto. do. do. 18 light, each | 6 | 0 | 0 |

### HEATING APPARATUS.

| | | | |
|---|---|---|---|
| **Glow Radiators,** cast iron, black Japan finish— | | | |
| 2-light, £2 ; 3-light, £3 ; 4-light | 4 | 0 | 0 |
| **Ornamental** hammered coppered, 2-light, £4 ; 3-light, £4/10/– ; | | | |
| 4-light | 5 | 0 | 0 |
| Laundry Irons, 7lb., with flexible cord, 100–240 volts, each | | 30 | 0 |
| **Soldering Irons,** with detachable copper bit, each | | 30 | 0 |
| Kettles, polished copper finish, fitted with safety fuse— | | | |
| 2 pint, 35/– ; 3 pint, each | | 47 | 6 |
| Glue pot, for workshop, each | | 25 | 0 |
| Electric ovens, prices according to size, each, from | 3 | 10 | 0 |

### ELECTRIC FANS.

| | | | |
|---|---|---|---|
| **Desk or Wall**— | | | |
| 100–120 volts, 12″, each £2/10 ; 16″, each | 4 | 0 | 0 |
| 200–250 volts, 12″, each £3 ; 16″, each | 4 | 10 | 0 |
| **Two Blade Cabin Fans**— | | | |
| 26″ sweep, £4 ; 36″ sweep | 5 | 0 | 0 |
| **Ceiling Fans**— | | | |
| Four-blade, Japan finish, 56″ sweep | 5 | 5 | 0 |
| Ditto, copper, oxydised, 56″ sweep | 6 | 0 | 0 |
| Speed regulator for ceiling fan, 6 speed, each | 1 | 0 | 0 |
| **Exhaust Fans,** with **Motor attached**— | | | |
| 24″ blades, 525 R.P.M., each | 20 | 0 | 0 |
| 36″ blades, 350 R.P.M., each | 30 | 0 | 0 |
| **Water Motor Fans,** 12″ blades, 30lb. sq. inch pressure, each | 3 | 0 | 0 |

### ELECTRIC BELLS.

### FOR HOUSE OR FACTORY USE.

| | Per point fixed. | | |
|---|---|---|---|
| All wires cased in zinc tubing, with indicator | 0 | 12 | 6 |
| With fixed wall or hanging pear pushes, best quality | 0 | 17 | 6 |

### BELLS.

| | | | |
|---|---|---|---|
| **Accessories**— | | | |
| 3″ gong, ordinary quality, 2/6 ; best quality, 5/– ; 6″, ea. | 0 | 17 | 6 |
| Continuous action, for alarm, 3″ gong, each | 0 | 10 | 0 |
| Burglar Alarm, window and door contacts, each | 0 | 1 | 6 |
| Ditto. gate and outdoor use, watertight, each | 0 | 2 | 6 |
| Portable bell sets, with flexible cord, for sick rooms, &c., ea. | 1 | 0 | 0 |
| Indicator Pendulum movement, per way | 0 | 2 | 0 |
| Ditto do. with mechanical replacement, | 0 | 3 | 0 |

### INSULATED WIRE.

| | | | |
|---|---|---|---|
| 110 yds. Insulated Wire, 20 gauge, india rubber covered | 0 | 4 | 0 |
| 110 yds., Insulated Wire, 18 gauge, D.C.C. | 0 | 7 | 0 |
| Twin Flexible Cord, silk covered, for hanging pushes, per yard | 0 | 0 | 2 |

### ZINC TUBING—For conveying Wire.

| | | | |
|---|---|---|---|
| ¼in. diam., per 100 ft. 2/9 | ⅜in. diam., per 100 ft. | | 4/– |
| 5/16in. diam., per 100 ft. 3/6 | ½in. diam., per 100 ft. | | 5/6 |
| **Beaded Bell Wire Cover—Kauri,** per 100 ft. | 0 | 6 | 0 |
| **Leclanche Batteries,** for above, per cell, each | 0 | 1 | 6 |
| E.C.C., dry cell | 0 | 2 | 0 |

### PUSHES.

| | | | |
|---|---|---|---|
| 2½″ wood, per doz. 8/– ; 3″ wood (best cocus), per doz. | 0 | 10 | 6 |
| 3″ China, White and Gold, each, 1/– ; 3″ brass, flat back, each | 0 | 1 | 3 |
| 3″ brass, flat back, each, 1/3 ; 3″ barrel, watertight, each, | 0 | 2 | 6 |
| 4″ brass flat back, 1/9 ; 4″ brass barrel, watertight, each | 0 | 4 | 6 |

### TELEPHONES AND TELEPHONETTES.

| | | | |
|---|---|---|---|
| **Hunningscone** pattern, and separate receiver, to work up to ¼ mile line, battery ringing | 1 | 7 | 6 |
| **House telephone,** fitted with combination receiver and transmitter, each | 0 | 17 | 0 |
| Ditto do. fixed transmitter, kitchen type | 0 | 11 | 0 |

The above may be used in conjunction with existing bell line.

### LONG DISTANCE TELEPHONE.

**Wall Pattern.**

| | | | |
|---|---|---|---|
| Half to 2 miles, two magnet generator | 2 | 10 | 0 |
| Ditto, 2 to 100 miles, as used by Government | 4 | 10 | 0 |
| **Portable** Telephones, for boundary riders, rifle ranges | 5 | 10 | 0 |
| **C Batteries,** for telephones, "Leclanche," complete, per cell | 0 | 1 | 6 |
| **Mining** Telephones, watertight and gas proof case | 6 | 10 | 0 |
| Inter-communication system for warehouses, fitted complete with switches, per installation | 2 | 0 | 0 |

### PELTON WATER WHEELS.

Head of Water, 90 feet.

| Size of Wheel. | H.P. | Cubic Feet. | Price unmounted. | Cast bed plate, cover & stop valve | Weight cwt. |
|---|---|---|---|---|---|
| 30″ | 9 | 73 | £65 | £110 | 25 |
| 36″ | 14 | 109 | £80 | £130 | 38 |
| 42″ | 19½ | 150 | £110 | £180 | 62 |
| 48″ | 25 | 196 | £140 | £230 | 80 |
| 60″ | 40 | 314 | £160 | £270 | 95 |

**Conductive Power and Resistance of Metals to Electric Current—**

| | Ohms. | | Ohms. |
|---|---|---|---|
| With Silver at 100 — | 2421 | Iron, 16.81 — | 1.2425 |
| Copper, 99.55 — | 2106 | Lead, 8.32 — | 3.236 |

## GOODS LIFT.

### Direct Coupled Electric Lifts—"Sprowson's."

**Speed.**—90ft. per minute, to travel 50ft.
**Car.**—Steel frame, lined with match boarding.
**Gear.**—Placed overhead. Hand-rope control.
**Ropes.**—Flattened Strand. H.W. Runners for Cars.

| Load. cwt. | Size of Car. | Well. | Price. F.O.B. £ | Extra per foot. £ | Extra. below gear. |
|---|---|---|---|---|---|
| 5 | 3′ x 3′ | 4′ x 3′9″ | 280 | 10 | 25 |
| 7½ | 4′ x 4′ | 5′ x 4′9″ | 320 | 15 | 27 |
| 10 | 5′ x 5′ | 6′ x 5′9″ | 335 | 15 | 29 |
| 15 | 5′6″ x 5′6″ | 6′ x 6′3″ | 372 | 15 | 42 |
| 20 | 6′ x 6′ | 7′ x 7′ | 454 | 20 | 46 |
| 30 | 6′6″ x 6′6″ | 7′6″ x 7′6″ | 560 | 20 | 50 |

## PASSENGER LIFTS.

Add 10% on above Table.

Speed, 180ft. per minute. Travel, 50ft. Car, Steel, Suspension Cradle. Flat Rope Strand. H.W. Runners.
Cabinet work, £65 extra. Gear overhead. Hand-rope control.
Switch in Car control, £30 extra. S drive, 4 ropes 2 conveyance sheaves.
Push Button control, £90 extra. Position of balance weight at back of lift.
Per Floor, £10 to £15 extra.

## HYDRAULIC LIFTS.

For 50 feet, speeds from 60 to 300 feet per minute.

**Goods lifts,** to lift 5 cwt. to 2 tons, £100 to .. .. .. £300
**Passenger lifts,** do. do. £130 to .. .. .. £400

Fittings according to design and situation, extra.

## CONTRACTORS' CRANES.

### FOR ELECTRIC OR STEAM POWER.

The **Electric Crane** is clean, light, and more easily set up compared with the heavier steam crane. Always ready for work; no extra time of engineer required before starting or after ceasing work.

The power is only used when actually in motion.

An electric 7-ton crane, if lifting one ton, only uses units of power in proportion. A unit being equal to 1⅜ h.p.

The City Council's fee for Electric Power in Sydney is 1½d. per unit per hour.

All motions are taken from one motor (totally enclosed series wound type), and for **large works** many cranes can be supplied with power from a central generating station, at a saving of fuel and labour, which fact generally applies to electricity and when used as a power otherwise.

## ELECTRIC CRANES (by J. Garrick & Sons, Edinburgh).

| To lift Tons. | Length of Jib. | Weight. Tons. | Price without Jib. | Extra for Steel Mast. | Extra for Steel Jib. |
|---|---|---|---|---|---|
| 2 | 60 | 7 | £250 | £10 | £68 |
| 3 | 60 | 10 | £275 | 12 | 68 |
| 4 | 70 | 12 | £296 | 14 | 74 |
| 5 | 70 | 13 | £350 | 16 | 90 |
| 7 | 70 | 16 | £424 | 18 | 93 |
| 10 | 70 | 21 | £500 | 20 | 111 |

## CONTRACTORS STEAM CRANES.

### Without Jibs or Woodwork.

| Tons. | Jib. | | | | |
|---|---|---|---|---|---|
| 5 | 70 | — | £320 | £10 | £90 |
| 7 | 70 | — | £425 | 10 | 90 |

A 7-ton Steam Crane generally consumes 1 to 1½ tons of coal per week.

## ELECTRIC PORTABLE JIB CRANE.

### To work 14ft. Radius (gauge from 3′6″ wide).

| To lift tons. | Price. | Travelling gear extra. |
|---|---|---|
| 2½ | £485 | £20 |
| 3 | £528 | £20 |
| 5 | £625 | £25 |

## OVERHEAD GANTRY TRAVELLING CRANES.

### To Lift 20 feet (single lift motor).

5 tons Traveller, 50 feet span, price .. .. .. .. £500
5 tons do. 3 phase motor, price .. .. .. .. £600

## ELECTRIC LOCOMOTIVE.

### For haulage, contractors' or mining trucks.

(Goodman's Rack Haulage Equipment for Steep Grades.)

Capacity 3 ton, Class B .. .. .. .. .. .. £650
Capacity 5 tons, Class BB. .. .. .. .. .. £925

## ELECTRIC ENGINE ("Invincible," Mort's Dock Co.).

8 h.p. **Stationary Type,** for saw mills, complete .. .. .. £120
Magneto, extra .. .. .. .. .. .. £4/10/–
**Electric Centrifugal Pumps,** combined, 4″, from .. .. £56

## PORTABLE ELECTRIC HAULAGE GEAR.

### Mounted on 4 Wheels.

Continuous Current or 3-phase Motor and Controller.

| Diam. of Drum. inches. | Width of Drum. inches. | Depth of Flange. inches. | Speed of Motor. R.P.M. | Price of drum with claw clutch | Price with motor and controller. |
|---|---|---|---|---|---|
| 18 | 10 | 5 | 850 | 150 | 170 |
| 18 | 12 | 5 | 750 | 188 | 210 |
| 18 | 14 | 5 | 1000 | 203 | 230 |
| 30 | 14 | 7 | 950 | 240 | 265 |

Add 10 to 15% for Australian States.

# PAINTER.

N.B.—In this as in all other cases where washes, fluids, or paint is applied, unless the timber is seasoned it will hasten its decay by retaining the pyroligneous acid found in all unseasoned timber. The following Australian timbers when dried or seasoned are said not to be molested by white ants. viz., the Jarrah and Turpentine. (*See* Index.)

**In measuring painting,** allow for all edgings, sinkings, or girths. In iron railing, and other open work, it is usual to take the two sides as flat work, and ornamental or small work twice for each side including Louvre blinds or lattice work.

**Sashes and Frames** should be measured as plain surfaces, including the glass and the exposed part of frames, with linings, &c., which should be girted ; but if the squares exceed three super feet, then it is better to take the sash bars by the lineal yard.

## MEMORANDUM.

White lead is the material for foundation of paint. **Linseed** oil is the vehicle and preservative, and forms a protective surface. To prevent blistering of this skin, boiled linseed oil is used in external work, and gives a glossy surface, but is apt to crack.

**Turps,** the usual solvent, causes the paint to work freer and thinner and to cover more surface.

**Driers** causes skin to solidfy by absorbing the oxygen.

Oxide of iron paints are the best for covering iron or metal, as they combine chemically with particles of surface covered.

## NOTES ON PAINTING.

A good even finish cannot be made of rough surface.

Two coat work is unsatisfactory.

Add more oil to paint on porous surfaces.

Do not thin paint with oil and driers to save labour, rub paint well into surface.

Add more turps for work to stand the sun and prevent blistering.

Clear white turps is better than yellow ; also pale linseed oil is better than a greenish yellow.

Do not put too much oil in second coat.

Boiled oil will crack, but gives a better finish and gloss.

To soften and clean a hard set paint brush, make some turps hot in a fry-pan, and well rub and work brush in the boiling liquid.

## TABLE SHOWING PRODUCTION OF TINTS BY MIXING.

**Sky Blue**—White and Prussian Blue.
**Coral**—White and Venetian Red.
**Silver Grey**—White and Black.
**Buff**—White, Orange, Chrome and Oxford Stone Ochre.
or White, Yellow Chrome, and Oxford Ochre.
**Azure Blue**—White and Ultramarine.

### Rough Rule for Ascertaining the Amount of Paint required to cover a desired surface.

Extract from "American Paint Co."

*Example*—House 20 x 40 x 30 feet High ; 2 coat work.

Add the number of feet in width front and rear, to the number of feet in length, both sides ; multiply this with the average height ; this divided by 300 will give the amount in gallons for two coats.

Thus 20 + 20 + 80 — 120 × 30 ft. high — 3600 ÷ 300 — 12 galls.

No rule can be given for accurately determining the amount required ; but the above is sufficiently correct for all practical purposes.

Should the surface be rough and porous, more paint will be required.

When measuring for quantity required, do not make any allowance for windows and other openings, as they will not any more than equal the extra surface of frames, mouldings and other projections. It is quite proper to take the length, breadth and height of a building in full.

One gallon covers on good surface—1 coat, 35 sq. yards ; 2 coats, 25 sq. yards ; 3 coats, 18 sq. yards.

### MATERIAL REQUIRED TO COVER 100 SQUARE YARDS WROUGHT PINE.

(From "American Painter's Reference.")

**Inside Work.**

| Each coat. | Boiled Linseed Oil. Pints. | Raw Linseed Oil. Pints. | Turpentine. Pints. | Driers. ozs. | White Lead. lbs. | Red Lead. lbs. |
|---|---|---|---|---|---|---|
| Priming | — | 5 | ½ | 2 | 12 | 2 |
| 2nd coat | ½ | 3 | ½ | 1½ | 10 | |
| 3rd coat | ½ | 3 | ½ | 1½ | 10 | |
| 4th coat | | 3 | ½ | 1½ | 10 | |
| Flatting | | | 2½ | 1½ | 8 | |
| | 1 | 14 | 4½ | 8 | 50 | 2 |
| **Outside Work** | | | | | | |
| Priming | 2 | 2 | ½ | 2 | 16 | |
| 2nd coat | 2 | 2 | 1 | 1¾ | 14 | |
| 3rd coat | 2½ | 2½ | ¾ | 1½ | 13 | |
| 4th coat | 2½ | 3 | ¼ | 1½ | 12 | |
| | 9 | 9½ | 2½ | 6¾ | 55 | 2 |

### AMOUNT OF PIGMENT ADDED TO 50lbs. WHITE LEAD, &c.

**To form Colours.**

| | | | |
|---|---|---|---|
| White Paint | 2lbs. Blue. | Black (no lead) | 50lbs. Lamp Blk. |
| Stone (Dark) | 1lb. Bt. Umber. | Green ,, | 50lb. Verdigris. |
| Stone (Light) | ½lb. ,, | Red Lead, 25 ; | red ochre, 25lbs. |
| Lead Colour | 1lb. Lamp Black | Chocolate—Lamp Blk., | 2lbs., Span. Brn., 48lbs. |

## PAINTERS AND DECORATOR'S MATERIAL.

| Prices Subject to Fluctuation. | s. | d. |
|---|---|---|
| Red Lead, 4d. per lb. ; or per cwt | 35 | 0 |
| White Lead, Champion's, 37/– ; Freller's (American), cwt. | 37 | 0 |
| Other makers from, per cwt. | 25/– to 36 | 0 |
| Putty, soft, per lb., 2½d. ; per cwt. | 15 | 0 |
| Patent Driers, per lb., 5d. ; per cwt. | 28 | 0 |
| Whiting, per lb., 1¼d. ; per cwt. | 5 | 0 |
| Zinc Powder, per cwt. | 30 | 0 |
| Ditto, in oil, Hubbard's | 40 | 0 |
| Linseed Oil, Blundell & Spence, Raw, per 5-gal. drum | 17 | 6 |
| Ditto do. do. Boiled, per 5-gal. drum | 18 | 6 |
| Turpentine, per gal. | 5 | 0 |
| Terebene, liquid driers, per gal. | 8 | 0 |
| Knotty Composition, per gal. | 10 | 0 |
| Japan Gold Size, per gal. | 9 | 6 |
| Size, per lb., 9d. ; and | 1 | 0 |
| Naphtha, per gal. | 1 | 6 |
| Methylated Spirit, per gal. | 3 | 0 |
| French Polish and White Polish, per gal. | 12 | 0 |
| Brunswick Black, for Ironwork, per gal. | 8 | 0 |
| Caustic Soda, per cwt. | 17 | 6 |
| Pumice Stone, per lb. | 0 | 3 |
| Potash, American, per lb. | 0 | 5 |
| Shellac, per lb. 2/6 to | 3 | 6 |
| Wood Preserving Oil, per gal. | 1 | 6 |
| **Colouring Materials, per lb.**— | | |
| Lamp Black, 4d. ; Drop Black, 1/– ; Vegetable Black | 1 | 6 |
| Burnt Sienna in Oil, 10d. ; Raw Sienna | 0 | 10 |
| Venetian Red, 2½d. ; Red Raddle, 3d. ; India Red | 0 | 7 |
| Chinese Red | 1 | 6 |
| Burnt Umber, 10d. ; Raw Umber, 10d. ; Purple Brown | 0 | 6 |
| Yellow ochre | 0 | 2½ |
| Hessian and Scrim, rolls of 50 yards, per yard | 0 | 6 |
| **Ready Mixed Paints,** per lb., in tins, from | 0 | 5½ |
| Aspinall's Enamel, all shades, 1/1 ; Bath Enamel | 1 | 4 |
| Finest White Enamel Paint, per gal. | 15 | 0 |
| Pacific Rubber, high grade paint, all shades, per gal. | 9 | 0 |
| Copper Liquid, per gal. | | 0 |
| Aluminium Enamel, per pint tin | 3 | 6 |
| Aluminium Bronze, per lb., 6d. ; Aluminium Leaf, per book | 0 | 3 |
| Gold Leaf, per book, 1/3 ; Silver leaf | 0 | 3 |
| Alumnoid, Fuller's (American), per lb. | 6 | 0 |
| Docker's Varnish Stains, per quart | 2 | 5 |
| Best **Copal Varnish,** exterior use, per gal. | 14 | 6 |
| Ditto do. do. interior use, per gal. | 13 | 6 |
| Ditto do. do. for wall paper | 18 | 6 |
| Oak Varnish, per gall. 9/– to | 11/– | |
| Black Japan Varnish, for mantels, per gall. | 14 | 6 |
| Finest French Oil Varnish, for polishes | 25 | 0 |

## PAINTERS' WORK.

### Labour at 1/3 per hour.

**Covering Plain Surfaces** of Wrought Wood, Iron, in common colours such as lead, stone, white, black, brown, chocolate, &c., including knotting and stopping. Per square yard.

| | Material. | Labour. | Total. |
|---|---|---|---|
| One coat in oil | 0 3 | 0 4 | 0 7 |
| Two coats in oil | 0 5 | 0 6 | 0 11 |
| Three coats in oil | 0 7 | 0 8 | 1 3 |
| Four coats in oil | 0 9 | 0 9 | 1 6 |
| Flatting, one coat | 0 2 | 0 1 | 0 3 |
| Every additional coat add | 0 2 | 0 2 | 0 4 |
| Cleaning down and rubbing off old work | | | 0 3 |

| **Eaves, Gutters and Downpipe—** | 1 coat. | 2 coats. | 3 coats. |
|---|---|---|---|
| Up to 9 inches wide, per yard run | 0 2 | 0 3 | 0 4 |
| Ornamental Iron Cresting, to 9″ wide | 0 2½ | 0 4 | 0 6½ |
| Ornamental Railings and Gates, &c., super. | 0 4 | 0 8 | 1 0 |

Work executed off ladders, add 10 per cent.
Close Picket Fencing, reckon 50 per cent. on plain work.
Close Lattice Work, reckon double measurement.

### PAINTING AND GENERAL SUMMARY (Knotting not included). Labour and Material, per sup. yard.

| | | Each coat. |
|---|---|---|
| **Painting and Stopping** (large surfaces), | 2 coats | 0 7 |
| | 3 coats | 0 10 |
| | 4 coats | 1 2½ |
| | 3 coats and flatted | 1 3 |
| **Varnisning,** 2 coats, ordinary | | 1 0 |
| Ditto. best varnish | | 1 6 |
| **Running,** ¼ to 1½ lines, any color, per ft. run | | 0 2 |
| Ditto do. do. in Duresco, per ft. run | | 0 1½ |
| **French Polishing,** handrails, per ft. run | | 0 6½ |
| **Fine Distemper** Kalsomining, Alabastine, Arabic, per yard | | 0 3 |
| Duresco, or similar finishing, coat stippled, per yard | | 0 4 |
| Distemper, ordinary, any tint | | 0 2½ |
| Lime Washing, per coat | | 0 1½ |
| **Wood Preserving Oil,** at 1/6 per gal. ; per coat, per yard | | 0 1 |
| **Cleaning down** and rubbing off old work, per yard | 0 2 to | 0 4 |
| Burning off and preparing old work, per yard | | 0 9½ |
| Frosting Glass, per sq. yard | | 2 0 |
| Staining on pine | | 0 2 |
| Ditto, sizing, per coat | | 0 2 |
| Staining, sizing, varnishing, 1 coat | | 1 0 |
| Ditto, varnishing, 2 coats | | 1 4 |

| VARNISHING. | Materials. s. d. | Labour. s. d. |
|---|---|---|
| Spirit varnish, each coat, per yard .. .. .. | 0 5 | 0 2 |
| Varnishing once in best copal, do. .. .. .. | 0 7 | 0 2 |
| Ditto, twice do. .. .. .. | 0 9 | 0 4 |
| For every additional coat, add .. .. .. .. | 0 3 | 0 2 |

| FRENCH POLISHING. | | |
|---|---|---|
| **French polishing,** per foot super. .. .. .. | 0 1 | 0 4 |
| Ditto to columns fluted do. .. .. .. .. | 0 2 | 1 0 |
| Ditto, to hand-rails, and small articles, per ft. run .. | 0 1 | 0 5 |
| Copal Varnish, per gallon .. .. .. .. | 12 0 | |
| Polish, per gallon .. .. .. .. .. | 11 0 | |

Before varnishing, the pores of the wood are filled with white size or common size, made by diluting glue to the proper consistency. For superior work after sizing, the surface is either sand-papered or rubbed over with pulverized pumice-stone, which gives an even face and fills up the pores of the wood. The best French polish is mixed and rubbed in with finely powdered pumice stone ; this is said to last twice as long as ordinary French polish.

*White Demar Varnish* is colourless, and if properly applied looks as well as French polishing.

## SPECIAL PAINTER'S WORK.

Per yard super.

*Items to be added to ordindry prices.*

| | Materials. s. d. | Labour s. d. |
|---|---|---|
| Finishing coat in party colours .. .. .. .. | 0 1 | 0 1 |
| Flatting coat or sanding, each .. .. .. .. | 0 2 | 0 2 |
| Grounds for imitations, graining, &c. .. .. .. | 0 1½ | 0 1½ |
| Lilac, peach blossom, fawn or salmon .. .. .. | 0 2 | .. |
| Olive green, deep blue, or Indian red .. .. .. | 0 4 | .. |
| Patent green, or yellow, and blue verditer .. .. | 0 5 | .. |
| Lake or Chinese vermillion .. .. .. .. | 1 0 | .. |
| Imitation granite, or splashed work .. .. .. | 0 4 | 0 2 |

Cleaning old work, rubbing down, or binging forward, to be charged day work.

### Plain Mouldings or Skirtings, Reveals, &c.

*Less than* 12 *inches girt or width.*

*Per lineal yard.*

| | Materials. s. d. | Labour. s. d. |
|---|---|---|
| Once in oil, common colours, as above, including knotting and stopping .. .. .. .. | 0 1 | 0 2 |
| Twice in oil do. .. .. .. .. | 0 2 | 0 3 |
| Three times in oil do. .. .. .. .. | 0 3 | 0 4 |
| Flatting coat do. .. .. .. .. | 0 1 | 0 1 |
| For every extra coat add .. .. .. .. | 0 1 | 0 1 |

### Enriched or carved Work.

*Per foot super.*

| Labour at 1/4 per hour. | Materials. s. d. | Labour. s. d. |
|---|---|---|
| Once in oil, common colours, as above | 0 1 | 0 1 |
| Twice in oil do. | 0 1½ | 0 2 |
| Three times in oil do. | 0 2 | 0 3 |
| For every extra coat ditto, add | 0 0½ | 0 1 |
| Flatting coat, add | 0 0¾ | 0 1 |

### LINES AND SHADOWS.

| | | |
|---|---|---|
| Mouldings, or edges, cut in common colours | 0 0½ | 0 1 |
| Mouldings picked in, or black lines | 0 0½ | 0 1½ |
| Broad ebony lines, to form panels | 0 0½ | 0 2 |
| Light and shadowed lines, ditto | 0 1 | 0 3 |
| Plain chimney-pieces, *each* once in oil | 0 6 | 1 0 |
| Ditto do. ,, twice in oil | 1 0 | 1 6 |
| Ditto do. ,, thrice in oil | 1 6 | 2 0 |

### GILDING.

| | Materials. | Labour |
|---|---|---|
| Gilding plain work in oil gold, including preparing, per foot super. | 2 0 | 3 0 |
| Ditto in burnished or matt gold | 2 0 | 4 6 |
| Bronze mouldings, not exceeding 2in. girt, per ft. run | 0 2 | 0 3 |
| Old gold, half-inch girth, ditto | 0 1 | 0 3 |
| Ditto, ¾ inch girth, ditto | 0 1½ | 0 3 |
| Ditto, 1 inch girth, ditto | 0 2 | 0 4½ |
| For every ¼ inch girth, add | 0 0½ | 0 1½ |

**Carved work,** once and a half to twice the above prices. The present wages of Gilders are 1s. 4d. per hour, bronze, 6/– per lb., book gold leaf, 1/3.

### GRAINING, &c.

| *Per yard super.* | Complete. s. d. |
|---|---|
| Plain oak, combed and shadowed | 1 6 |
| Mahogany, maple, cedar, or sycamore | 1 9 |
| Satin wood, coromandel, rosewood, bird's eye, maple, pollard oak, or Huon pine | 2 3 |
| Yew tree, amboyna, or walnut | 2 9 |
| **Veined Marbling,** including white ground | 2 3 |
| Dove, bardilla, or black and gold | 3 0 |
| Sienna, brocotella, rouge royal, or green verd | 4 0 |
| Venetian, French, or Devonshire | 5 0 |
| Lapis Lazuli, or blue and gold | 6 0 |

If to carved work or to columns, add one-half the above prices; if to fluted columns, double them.

**Writing Complete.**

| *Per letter per inch in height.* | | s. | d. |
|---|---|---|---|
| Plain painted letters, | 1 to 4in. | 0 | 1 |
| Ditto | 4 to 8 inches high | 0 | ¾ |
| Ditto | 8 inches and over | 0 | ½ |
| Egyptian or sunk letters | | 0 | 2 |
| Gold, plain or bronze, with gilt edges or color | | 0 | 4 |
| Ditto, Egyptian or sunk | | 0 | 5 |
| If shaded, add ½d., if double shaded | | 0 | 1 |
| If to imitate projecting letters, add | | 0 | 2 |
| **Writing on glass,** plain burnished gold, with two shades, on coloured ground | | 0 | 5 |
| Ditto, with three shades, ditto | | 0 | 7 |
| Embossing and gilding ornamental letters with two shades on coloured ground | | 1 | 4 |

For German text, old English, ornamental or ancient writing, add 50 per cent. to the above.

DISTEMPER AND COLOURINGS—MATERIAL ONLY.

| | s. | d. |
|---|---|---|
| **Arabic,** a dry mineral powder for colouring gal. iron roofs and outside walls ; mixed with water. In colors, blue, white, and terra cotta. Said to prevent rust on iron, and does not contaminate rain water. 11lb. packet covers 30 sq. yards on dressed pine. | | |
| **Alabastine,** Church's—a dry powder, in 27 tints ; to mix with water ; for internal wall work ; mixed with oils for priming and red brick painting before tuck work, 5lb. pkt. | 1 | 6 |
| **Alabastine Opalic,** for relief decoration *in situ* with special opalic machines, 5lb. packet | 2 | 6 |
| **Duresco,** for decorative coloring and stippling, per cwt. | 45 | 0 |
| **Kalsomine,** Johnston's, for interior decoration, to mix with hot water, 5lb. packets, white, 1/6 ; colours, per packet 1/9 and | 1 | 10 |
| **Calcimine,** cold water distemper, 5lb. packet, all colours | 1 | 0 |
| **Indricine,** cold water distemper, for outdoor work, all colours, per 5lb. packet | 1 | 9 |
| Hodges' Pat. Cold Water Kalsomine, 17 tints, 5lb. packets | 1 | 0 |
| **Endura** Cold Water Paint, for rough surfaces, where ordinary oil paint cannot be used. Oxydised Paint can be used with a spray, 2½d. per lb. mixed. | | |
| **Jelstone,** 5lb. packets | 1 | 2 |
| **Indeliblo.**—A cold water paint, can be washed with hot soap and water, or scrubbed. | | |
| Dampney's Distemper, per cwt. | 28 | 0 |
| Pulverite, per cwt. | 38 | 6 |
| Cold Water Paint, ready for mixing, for use with Spray Machine | 30 | 0 |

**Automatic Spray Machines,** for large surfaces. Have been used with success.

There are several kinds, from the simple hand syringe to the hand force pump description. Acetylene gas is also used as a generator of force required. *See* Index PLANT.

## PATENT PAINTS.

**Ferrodor** Paint is a preservative paint for Steel, iron, or timber. It is said to be superior to oxide of iron or red lead, as it will not crack or peel off. 1 cwt. covers when mixed, 713 sq. yards, and a gallon weights 18½ lbs. Red lead covers 377 sq. yards, and a gallon weighs 36½ lbs. To thin the paint add 30 lbs. pure boiled Linseed Oil to 1 cwt. of paste. About 50/– per cwt.

**Avenarius** wood preservative oil and white ant destroyer—
For ropes and walls, fence posts, per gallon .. .. 4 6
**Bain's White Ant Exterminator.** *See* advt. page 20. .. 4 0
**Damp Resister,** for cellar walls and weather side of walls. Forms a glazed surface in colours, if desired. One gallon said to cover 50 sq. yards .. .. .. .. .. .. 7 6
**Jodelite,** for preventing fungus and dry rot, white ant and teredo navalis, or sea worm ; also for preserving *wood-paving, wharf piles, bridge beams, fencing posts,* &c. ; rats will not touch wood work treated by it. Price, 1 gal., 5/– ; 5 gallons .. .. .. .. .. .. .. 22 6
**Szerelaney.**—A stone liquid, waterproof and paste, ground in oil .. .. .. .. .. .. .. .. 23 6
**Marvelo** dry oil paint, per lb., 5d. ; per barrel, per lb. .. .. 0 4
**Bitumene** Solution, 10 gallons = 1 cwt., said to cover 45 sq. ft., per gallon .. .. .. .. .. .. .. 4 0
P. & B. Paints and Compounds, all colours, and for different purposes, per gallon, from .. .. .. .. .. 6 0
S.P.C. ditto and Des Moines Elaterite Paints. Prices on application.
**Ferol.**—A pat. liquid to take the place of linseed oil, &c:, in paint, in 5 gallon drums, 8/– per gallon. *See* advt. p. 12.

## DEE'S RUST PREVENTER.

For coating Steel, Iron, and other Metals.

Preserves colouring, if painted work ; keeps polished surfaces bright. One gallon said to cover 600 sq. ft. rough work, 1000 sq. ft. smooth.

## SUNDRIES.

**Tarring.**—One gallon of tar with 1lb. pitch will cover one square, or 11 super yards.

Coal Tar, per gallon, from 4d. to 6d.

Wood-preserving oil, per gallon, 1/– to 1/6.

**Caulking.**—One cwt. of oakum will do 700 lineal feet of seams in 2½ inch planking, but on good work, with fine seams, half this quantity will suffice.

**Chunam.**—1 bushel fine sifted lime and 2 gallons best thin black oil, well mixed together, will be found a cheap and effectual substitute for white lead in T. & G. flooring for verandahs, &c.

**Glazier's Putty,** imported, at 12/– per cwt. is much cheaper than *Chunam* for lipping the joints of masonry, or as a substitute for white lead. This is owing to the large amount of labour required in preparing the lime putty or chunam, which is not imported.

## DURABLE WHITE WASH

**(American Congress Recipe).**

Used on "White House," Washington.

Slack ½-bushel of unslacked lime with boiling water, covered to keep in steam. Strain through fine sieve. Add a peck of salt previously dissolved in warm water. 3lbs. ground rice, boiled to a thin consistency; ½lb. powdered whiting; 1lb. of clean glue, previously dissolved. Boil the mixture for an hour in a small kettle inside another.

Then add five gallons of hot water, stir it well, stand for a few days, and put on hot with fine or coarse brush, according to finish required. It remains brilliant for many years. Colouring matter may be added if desired. 1 pint covers 1 yard.

## GOOD ROUGH PAINT FOR ROOFS AND OUTBUILDINGS.

Mix slowly 1 gallon crude petroleum with 3lbs. brown metallic. Thin down with a little coal oil. Apply as ordinary paint.

## TO CLEAN PAINT WITHOUT DETERIORATING OR AFFECTING SAME.

Dip a piece of flannel or felt in hot water and powdered whiting, and apply briskly.

Hot water and Ammonia, a tablespoonful to a quart, wiped over surface to remove grease and dirt.

## WHITEWASH.

2lbs. sulphate of zinc; 1lb. salt to ½ bushel of lime, will adhere firmly on wood or galvanised iron, forming a cooling covering.

## COLOURED WASHES.

1 bushel of lime, 4lbs. yellow ochre, makes good cream colour.

2lbs. Indian red, 7lbs. amber, 2lbs. lamp black, makes good fawn colour.

7lbs. raw umber, 4lbs. Lamp black, makes good buff stone colour.

## QUICK FIRE EXTINGUISHER.

A solution of pearl-ash in water thrown upon a fire, will extinguish it immediately.

## CLEANING DOWN, &c.

**Remove splashes** from windows.—Hot solution of soda and water. Remove splashes from floors.—Use turpentine.

To **remove Paint** or **Varnish** from woodwork or machinery—

(1) Dissolve 1lb. of potash in a gallon of water, and apply with an old mop.

(2) Let it remain for ten minutes, when the paint will wash off.

(3) The addition of a little hot lime is an improvement.

**To stain wood Mahogany.**—If soft wood is washed with a solution of nitric acid, it will take on a brown stain having the appearance of mahogany.

# GLAZIER.

Glass is measured by the superficial foot, and the glazing is generally done by the firm supplying the glass. The following prices include glazing and putty.

Ordinary curved plate glass is charged according to size, from 20% extra.

| | per ft. super. s. d. |
|---|---|
| **¼″ Polished Plate—** | |
| Up to 12 feet super | 1 6 |
| 12 to 25 ,, | 1 8 |
| 25 to 50 ,, | 2 0 |
| 50 to 60 ,, | 2 3 |
| 60 to 70 ,, | 2 6 |
| Special Prices for larger sizes. | |
| **Polished 3/16″ Plate,** additional | 0 3 |
| **Ground Plate,** additional | 0 6 |
| **Sheet Glass**—United inches— | |
| 16 oz., from | 0 3 |
| 21 oz. ,, | 0 4 |
| 26 oz. ,, | 0 6½ |
| 32 oz. ,, | 0 8 |
| **Ground Sheet,** 16 oz., 7½d. ; 21 oz., 9½d. ; 26 oz., 11½d. ; 32 oz. | 1 1½ |
| **Enamelled,** 8½d. ; 21 oz. | 0 11½ |
| **Plain Colors,** Blue, Ruby and Amber | 0 9½ |
| Green | 0 11½ |
| **Figured Rolled,** (comprising Japanese, Mallocene, Chances', "B" and "G" and large and small Muranese)— | |
| White, 10d. ; Tinted | 0 11½ |
| **Cathedral** | 0 8½ |
| **Muffled** | 0 11½ |
| **Sheet Glass.**—The above, if by the original sheets, 1d. per ft. less. | |
| **Rough Rolled and Rough Cast,** ⅛″, 6½d ; 3/16″, 8½d. ; ¼″ | 0 10½ |
| **Wired Rolled,** one width only, viz., 24″ ; lengths up to 9 feet | 1 9 |

### LARGEST SIZES OF SHEET GLASS MANUFACTURED.

| Weight of per sq. foot—oz. | Length. | Width. | Area in sq. ft. |
|---|---|---|---|
| 15 | 55 | 38 | 13 |
| 21 | 85 | 49 | 22 |
| 26 | 85 | 49 | 22 |
| 32 | 85 | 49 | 22 |
| 36 | 70 | 44 | 19 |
| 42 | 70 | 44 | 19 |

## WEIGHT OF ROUGH GLASS PER SQUARE FOOT.

| Thickness, ins. | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 1 |
|---|---|---|---|---|---|---|---|---|
| Weight, lbs. .. | 2 | 2½ | 3½ | 5 | 7 | 8½ | 10 | 12½ |

**3/16″ Corrugated Rough Rolled,** 72 x 27, per sheet .. .. 27/–

## SILVERED PLATE.

| | sup. ft. | | sup. ft. |
|---|---|---|---|
| Up to 5 feet super .. | 1 10 | 8 to 10 feet super .. | 2 3 |
| 5 to 6 ,, .. .. | 1 11 | 10 to 12 ,, .. .. | 2 4 |
| 6 to 7 ,, .. .. | 2 0 | 12 to 20 ,, .. .. | 2 6 |
| 7 to 8 ,, .. .. | 2 1 | 20 to 40 ,, .. .. | 2 8 |

Ornamental Silvered Plate, per foot super, 3/– to .. .. 4 0
**Diamond Rolled,** White, 1/3 ; Amber, per ft. super .. .. 1 6
**Opal,** Pot, for Lamps, per ft. super .. .. .. .. 0 9
Smoothed for painting on, per ft. super. .. .. .. 1 0
**Prismatic Rolled Glass,** for increasing the light, per ft. super. .. 2 3
**Stained Enamelled** (Amber or Blue ornaments), per ft. super. .. 1 6
**Engraved** (Blue, Ruby and Amber), per ft. super. .. .. 2 6

## GLAZING BARS.

**Pennycook's Patent Glazing Bars,** per ft, lineal. from .. .. 1 6
**Princeps Glazing Bars,** fitted with capping, per lineal ft.—
Straight, 1/5 to 1/9 ; stepped .. .. .. .. 2 0
Brass attachments, shoe and head, per set .. .. .. 1 5

## BEVELLING.

| Wide .. .. .. | ¾″ | 1″ | 1½″ |
|---|---|---|---|
| Up to 10 feet .. | 0 5 | 0 7 | 1 0 |
| ,, 15 ,, .. | 0 6½ | 0 9 | 1 3 |
| ,, 20 ,, .. | 0 9 | 1 0 | 1 8 |
| ,, 25 ,, .. | 1 0 | 1 6 | 2 0 |
| ,, 30 ,, .. | 1 6 | 2 0 | 2 6 |

Curved Edges Special Prices.

## LABOUR.

**Glazing** and **Cutting,** per sq. ft. .. .. .. .. 1½d. to 0 2
Hacking out old panes and preparing for glazing .. .. 0 1
Cutting circular or clear, ground and fluted glass, per ft. run .. 0 1
Ditto do. on rolled or hammered glass, per ft. run .. 0 1½
Polishing edges, plate glass, under ⅜″ thick, from .. .. 0 1
Repolishing Plate glass, per sq. ft. .. .. .. .. 1 0

## CUTTING GLASS GAUGE TUBES.

Very few know how easy it is to cut a quarter, or even an eighth of an inch off a gauge tube, and many wasters are made from attempting to do it. The proper way is to take the point of small file and simply scratch the inside of the tube all round at the part you want it cut, and if the piece does not fall off in your hand at once, lay it aside for a little and you will find it as you want it in a very short time.

## LEAD LIGHT WORK.

| | sup. foot. |
|---|---|
| Plain and obscured diamond lead light, for schools .. | 1 6 to 2 3 |
| General domestic work, tinted cathedral .. .. | 2 3 to 8 0 |
| Special work and designs .. .. .. .. .. | 5 0 to 15 0 |
| Gothic cathedral and church .. .. .. .. | 18 0 to 30 0 |
| Best figure and gothic work, up to .. .. .. .. | 40 0 |
| Embossing, not including glass .. .. .. .. | 3 0 to 3 6 |

## PAVEMENT AND FLOORLIGHTS.

Rough cast glass is used in floors to give light to spaces that cannot be otherwise lighted. Its strength is greater than granite when subjected to a transverse strain. It is as slippery as ice ; but this disadvantage is neutralised by using it in small squares or quarries set or fixed in a raised iron frame.

## PATENT PRISMATIC LIGHTS

### (Hayward's or Hyatt's), &c., per foot super.

For illuminating basements, &c.

| | s. d. |
|---|---|
| Gratings glazed with $\frac{3}{4}''$ rough plate glass .. .. .. | 7 2 |
| Ditto 1″ do. .. .. .. .. | 8 3 |
| Ditto, with cleared flint glass, 5″ x 5″, flat on top and corrugated underside .. .. .. .. .. .. .. | 7 9 |
| Ditto Oxford pattern .. .. .. .. .. .. | 8 10 |
| 25 lens pattern, for vertical lights (glass 5 x 5) .. .. .. | 13 0 |
| Stone faced pavement light .. .. .. .. .. | 12 0 |
| Seven lens illuminating gratings .. .. .. .. .. | 13 0 |
| Five lens do. .. .. .. .. .. .. | 13 9 |
| Prismatic ditto, single lens bulls eye .. .. .. .. | 14 3 |
| Five lens, with glass reflecting bar .. .. .. .. .. | 14 3 |
| 24 lens illuminated gratings .. .. .. .. .. | 14 3 |
| Illuminated gratings, arranged in flaps, hinged at the back or sides, extra per super. ft. .. .. .. .. .. | 10 6 |
| Silvered reflectors, fitted to any of the above lights, extra per super. ft. on above prices .. .. .. .. .. | 2 6 |

N.B.—Any of the above with ventilators without extra charge.

## PRISMATIC LIGHTS.

### Colonial Manufacture.

| | |
|---|---|
| Semi-Prism, 4″ x 3″ Glasses, per sq. foot | 8 6 |
| All Prisms, 4″ x 3″ Glasses, per sq. foot | 10 0 |
| All Lenses, 4″ x 3″ Glasses, per sq. foot | 6 6 |
| Stallboard Lights, 5⅜″ glass, reflecting lenses, per sq. foot | 8 0 |

The lenses and prisms are fitted in the pockets with improved patent mastic putty, thus avoiding lamination through contraction of the iron frames.

The frames are cast locally from the best imported iron.

The glass is the best imported English make, the same as that used by the makers of the highest class pavement lights.

## EXAMPLE OF ESTIMATING.

### Glazing Bar Skylight Roof, per square.

| | £ | s. | d. |
|---|---|---|---|
| 8 bars, 10ft. = 80ft. at 1/7 | 6 | 6 | 0 |
| 16 shoes, at 7d. | 0 | 10 | 0 |
| 16 cuts to bars, at 3d. | 0 | 4 | 0 |
| | 7 | 0 | 0 |
| Fixing above framework | 3 | 0 | 0 |
| Material and labour | £10 | 0 | 0 |

| Add price of— | per sup. ft. |
|---|---|
| Wire | 0 2 0 |
| Rolled glass | 0 1 9 |
| Profit, 20% | 0 0 9 |
| | 0 4 6 |

## CLOISONNE GLASS.

This decorative glass is made by silver and gilt wire designs filled in with different coloured granular glass, fastened with translucent cement and hermetically sealed between double glasses to prevent dust or moisture penetrating. Being very strong, and enforced with wire, it requires no stiffening bars to fix it ; burglar proof. Unlike lead light, the design is transmitted from both sides. Can be made in sizes up to 9″ x 4″. Price, 4/– per super. ft.

## RECIPE TO REMOVE OLD GLASS FROM SASHES.

Run a hot soldering iron (or other hot metal) along surface of putty to soften same, then scrape with knife or chisel.

# PAPER HANGER.

This trade has been almost revolutionised during the last five years, the old tawdry papers giving place to the thoroughly artistic. Entirely new materials and designs are now employed for wall decoration.

A piece of paper is 36 feet long by 21 inches wide, and contains 63 sup. feet, or 7 sup. yards, but the ends are generally injured by packing, exposure, unrolling, &c. ; in papering there is also a further waste in matching the ends according to the size of the pattern ; an allowance must therefore be made from 5 to 9 super. feet, in calculating the number of pieces required for a given area, after deducting the openings. Any portion of a piece required is charged as a whole piece.

## TABLE FOR MEASURING ROOMS FOR PAPER.

Measure Round the Walls in Feet. Including Doors, Windows, &c., and not exceeding these measures.

| Height in Feet. | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 68 | 72 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $7\frac{1}{2}$ and under 8 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 8 | 8 | 9 | 9 | 10 |
| 8 ,, $8\frac{1}{2}$ | 3 | 3 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 |
| $8\frac{1}{2}$ ,, 9 | 3 | 4 | 4 | 5 | 5 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 11 |
| 9 ,, $9\frac{1}{2}$ | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 7 | 8 | 9 | 9 | 10 | 10 | 12 |
| $9\frac{1}{2}$ ,, 10 | 3 | 4 | 5 | 5 | 6 | 7 | 7 | 8 | 9 | 9 | 10 | 10 | 11 | 12 |
| 10 ,, $10\frac{1}{2}$ | 4 | 4 | 5 | 5 | 6 | 7 | 8 | 8 | 9 | 10 | 10 | 11 | 12 | 13 |
| $10\frac{1}{2}$ ,, 11 | 4 | 4 | 5 | 6 | 7 | 7 | 8 | 9 | 9 | 10 | 11 | 11 | 12 | 13 |
| 11 ,, $11\frac{1}{2}$ | 4 | 5 | 5 | 6 | 7 | 8 | 8 | 9 | 10 | 10 | 11 | 12 | 13 | 14 |
| $11\frac{1}{2}$ ,, 12 | 4 | 5 | 6 | 6 | 7 | 8 | 8 | 9 | 10 | 11 | 12 | 12 | 13 | 14 |
| 12 ,, $12\frac{1}{2}$ | 4 | 5 | 6 | 7 | 7 | 8 | 9 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| $12\frac{1}{2}$ ,, 13 | 4 | 5 | 6 | 7 | 8 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 14 | 15 |
| 13 ,, $13\frac{1}{2}$ | 5 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 11 | 12 | 13 | 14 | 15 | 16 |
| $13\frac{1}{2}$ ,, 14 | 5 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 14 | 15 | 16 |
| 14 ,, $14\frac{1}{2}$ | 5 | 6 | 7 | 8 | 9 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| $14\frac{1}{2}$ ,, 15 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 14 | 15 | 16 | 17 |

**Rule.**—Find the height of the room between the skirting and cornice in the left hand column, and the nearest Figures to the measures round the Walls on the top line ; the figures where the two the lines would cross or meet will show the number of pieces a room will take.

To find the quantity of Paper required for Ceilings, multiply the length and breadth in feet together, and divide by 50.

| | Material. Per roll. From | | To | | Labour. Per roll. From | | To | |
|---|---|---|---|---|---|---|---|---|
| Ordinary machine printed pulps .. | 0 | 3 | 1 | 3 | 0 | 6 | 1 | 0 |
| Lining Paper .. .. .. .. | 0 | 3 | 1 | 0 | 0 | 6 | 1 | 0 |
| Ditto, stout, 30″ wide .. .. .. | 1 | 0 | 1 | 6 | 0 | 6 | 1 | 0 |
| Common pulps on self-coloured paper.. | 0 | 4 | 0 | 9 | 0 | 9 | 1 | 0 |
| **Papers—** | | | | | | | | |
| White or coloured, prepared grounds | 0 | 7 | 1 | 6 | 0 | 9 | 1 | 0 |
| Satin, prepared grounds .. .. | 1 | 0 | 3 | 0 | 0 | 10 | 1 | 6 |
| Flock, prepared grounds .. .. | 2 | 0 | 5 | 0 | 1 | 0 | 1 | 6 |
| Raised Flocks, for ceilings .. .. | 10 | 0 | 16 | 0 | 1 | 9 | 2 | 6 |
| Dark and light pulps, floral or geometrical designs .. .. .. | 0 | 3½ | 0 | 8 | | | | |
| Sanitary wall paper .. .. .. | 0 | 5 | 1 | 6 | 1 | 0 | 1 | 3 |
| Can be washed when soiled, ceiling paper | | | | | 1 | 0 | 1 | 3 |
| Floral and other patterns, best white pulp, machine .. .. .. | 0 | 9 | | | 0 | 9 | 1 | 6 |
| Ditto, hand made .. .. .. | 2 | 6 | | | 1 | 6 | 2 | 3 |
| Gold papering, with dados, friezes, &c., to match .. .. .. .. | 0 | 10 | | | | | | |
| Plain pulps, all colours, for filling .. | 1 | 6 | | | 1 | 0 | 1 | 6 |
| Ditto, figured grounds .. .. .. | 1 | 6 | 2 | 6 | 1 | 0 | 2 | 0 |
| Ditto, ordinary .. .. .. .. | 0 | 3 | 1 | 6 | 0 | 9 | 1 | 6 |
| Figured Silks .. .. .. .. | 1 | 0 | 2 | 0 | 1 | 6 | 3 | 0 |
| Figured satin papers .. .. .. | 2 | 0 | 12 | 6 | 1 | 6 | 3 | 0 |
| Ditto do hand made .. .. | 7 | 0 | 10 | 6 | 2 | 0 | 3 | 6 |
| Plain or decorated ingrained papers, for fillings, all shades .. .. .. | 2 | 6 | 5 | 0 | 1 | 6 | 2 | 0 |
| Plain crepes, heavy paper, all colors, double rolls, 30″ wide x 16 yds. long | 5 | 6 | | | 1 | 6 | 2 | 0 |
| Ditto do. bright red .. .. | 6 | 0 | | | 1 | 6 | 2 | 0 |
| Embossed papers, all tints .. .. | 3 | 6 | | | 2 | 0 | 2 | 6 |
| Imitation leather papers, wood colourings | 5 | 6 | | | 2 | 0 | 2 | 6 |
| Ceiling papers .. .. .. .. | 0 | 6 | | | 1 | 0 | | |
| Damp-proof papers, for damp walls .. | 0 | 8 | | | 0 | 6 | 0 | 10 |
| Tint, self coloured, lining paper .. | 0 | 9 | | | 0 | 9 | 1 | 0 |
| Borders, to match all papers, 3″, 5″, 7″ to 10″ wide .. | | | | | 0 | 9 | 2 | 6 |
| | | | | | From s. d. | | To s. d. | |
| Friezes, borders, 12″, 18″, 21″ wide .. .. .. | | | | | 0 | 9 | 2 | 6 |
| Friezes, borders, used with plain ingrains or stripes 10″ | | | | | 0 | 3 | 1 | 6 |
| " Pomegranate," " Paparerous," " Tulip," " Landscape," " Nasturtium," " Meadows," " Forests" &c., 21″ wide, 1/– to 3/6 ; 30″ wide .. .. .. | | | | | 5 | 0 | 6 | 0 |
| Dados, all patterns, per roll .. .. .. .. | | | | | 1 | 0 | 3 | 0 |

**Labour, per piece only.**

| | From s. d. | To s. d. |
|---|---|---|
| Straining canvas, including tacks and slipping .. .. | 0 9 | 1 3 |
| Hanging lining paper .. .. .. .. .. | 0 6 | 1 0 |
| Ditto common or satin paper.. .. .. .. | 0 6 | 1 0 |
| Ditto flock .. .. .. .. .. .. | 1 0 | 1 6 |
| Pumicing lining paper .. .. .. .. .. | 0 2 | 0 3 |
| Hanging borders, per doz. yds. .. .. .. .. | 0 9 | 1 3 |
| Plain crepes .. .. .. .. .. .. | 1 0 | 1 6 |
| Sizing, 2 coats, and varnishing paper .. .. .. | 1 6 | 2 6 |
| Ditto, do., and twice varnishing .. .. .. | 2 0 | 3 0 |
| *Extras.* | | |
| Hanging horizontal papers .. .. .. .. | 0 2 | 0 3 |
| **Tinting and Bronzing—** | | |
| Relief paper, tinting and bronzing, per yard .. .. | 0 6 | 2 0 |
| Ditto, bronzing .. .. .. .. .. | 1 6 | 2 6 |
| Ditto, in colours | | |
| Hanging Ingrain borders, 12″ to 18″, per yard .. .. | 0 2 | |
| Ditto, " Lignomur," " Anaglypta," &c., per panel .. | 0 6 | 2 6 |
| Ditto, do. do. fillings, per yard .. .. | 0 3 | 1 6 |
| Ditto, do. do. mouldings, run yard.. .. | 0 2 | 0 8 |

Wages of Paperhanger, per day, 9/– to 10/–. For Special Work, 10/– to 11/–.

Ridgeley's " Ideal " Trimmer, for common or special papers. This cutter trims " Anaglypta," and other raised material. Prices for outfit, complete :—6ft., 22/–; 7ft., 25/–; 8ft., 27/–; 9ft., 29/–.

For superior decorations no prices can be quoted, since the cost of hanging entirely depends on the design and the number, size, and shape of the panels.

## PASTES.

### Paste for Papering Painted Work.

Mix the flour and water thinner; to each gallon add 1oz. resin.

### Labelling Paste for Tin.

Mix stiff paste of flour and water, 1 gallon; add 2oz. tartaric acid, 1 pint treacle. Boil stiff, preserve with ¼ oz., or 10 drops

### Paste for Paper to Iron or Metal.

Boil dextrine and water to consistency of very thin glue. Remove all traces of grease or oil with lime wash previously.

WHITE ANT EXTERMINATOR AND INSECT DESTROYER.

One of the simplest and most effective; used as a spray. Mix—Arsenate of soda, 1lb. Warm water, 4 gallons.

## PATENT DECORATIVE PULPS.

**Anaglypta** is a moulded pulp relief material, white, for inside decoration, for walls, ceilings, friezes and dados. Closely resembles the best of plaster and wood mouldings, and are lighter and cheaper—

| | From | To |
|---|---|---|
| Ceiling and Wall fillings, in rolls, 21″ x 12 yds, per yd. | 1 0 | 2 0 |
| Ceiling Panels, 2′ x 2′, per panel .. .. .. | 2 6 | |
| Dado Panels, 3′ x 2′ wide, per panel.. .. .. | 3 0 | 5 0 |
| Dado Rollers, per lin. yd .. .. .. .. | 1 0 | |

Prices of above according to relief.

**Muraline.**—A patent wall decoration, 24″ wide x 12 yds.

| | | |
|---|---|---|
| long, per piece .. .. .. .. .. | 4 0 | 18 0 |
| Printed in oils, embossed, per yard run .. .. | 3 6 | |
| Hanging, per yard .. .. .. .. .. | 0 4 | |

**Salamander.**—Made of Asbestos fireproof. Same prices and designs as "Anaglpyta." Information as to decoration of these materials, in any design, on application.—Whitelaw & Co., Sydney and Melbourne. The above is sometimes beautfully tinted and bronzed.

**Lignomur.**—A perfectly white finished material for relief decoration. The lightness and readiness with which it adheres and joins, renders it a very acceptable and artistic method for bas-relief papering. Like "Anaglypta" and "Salamander," it lends itself to any style of internal ceil and wall decoration. Can be tinted in shades, or in variegated coloured bronzes.

**Labour** price, fixing, according to design, per panel, from 0 6 2 6

Cross battening, if required, extra.

Strong canvas, per yd., 6d. ; sewing same, per yd., 1d. ; Tacks, per 1000, 9d. ; Double size, per lb., 4d.

Use the pure flour and water paste, no alum, just mixed, but cool, so as not to injure the colouring.

**Hanging Plain Tinted Papers.**—White lining papers should be laid first, especially under red. On no account let papers soak with too much paste, as shrinkage and alteration of tint will occur. Reverse papers every other length to get uniform tint.

## RAISED METAL LETTERS.

Gilt, Silvered, or Electroplate.

| | Per letter. From | To |
|---|---|---|
| 2″ to 12″ high .. .. .. .. .. .. | 1 4 | 5 6 |
| 15″ to 24″ ,, .. .. .. .. .. .. | 7 6 | 17 6 |

30″, 25/– ; 36″, 30/– ; 48″, 57/6.

The "Brilliant" Concave Copper Letter (gilded), fixed in position—

| | | |
|---|---|---|
| 1″ to 4″ .. .. .. .. .. .. | 0 6 | 2 0 |
| 5″ to 10″ .. .. .. .. .. .. | 2 6 | 5 9 |

Metal Ribbon backgrounds and scrolls, 2d per inch depth, extra on above.

# LIGHTING, HEATING, FIRE RESISTING.

## LIGHTING.

**For Country Residences.**

### ACETYLENE GAS COMBINATION GAS GENERATOR AND PURIFIER PLANTS.

**Exclusive of Pipes and Fittings for Lights.**

The present price of Carbide is from 2d. per lb. or 20/– per cwt.

One pound is said to supply a light equal to 25 candle power for six hours' duration.

| Capacity for 6 hours. | Plant— Stock. | Superior. | Cost per hour. | Consumption of Carbide per hour. |
|---|---|---|---|---|
| 5 lights | 7 10 | 12 15 0 | 0 1 | ½lb. |
| 10 ,, | 9 10 | 17 10 0 | 0 2 | 1lb. |
| 15 ,, | 12 10 | 22 0 0 | 0 3 | 1½lb. |
| 20 ,, | 13 10 | 24 5 0 | 0 4 | 2lbs. |
| 30 ,, | 18 0 | 29 0 0 | 0 6 | 3lbs. |
| 50 ,, | 25 0 | 42 10 0 | 0 10 | 5lbs. |

Further particulars—advt. pages 2 and 13.

**Patent Chemical Purifiers,** separately, 5 to 15 lights, each .. 2 0 0
Ditto, 15 to 30 lights, 60/– ; and 50 to 100 lights, each .. 5 0 0

### PORTABLE CONTRACTORS' LAMP, 100 c.p. to 400 c.p., Acetylene Gas Generator.

Complete on wheels, £18 to .. .. .. .. .. 20 0 0

### KITSON LIGHT.

" The Kitson " Kerosene Oil Gas Light, from 200 to 1000 c.p., for contractors **illuminating large areas, show grounds, country streets,** continental concerts, dredges, shop fronts.

**Three lights** illuminates 5 acres.

**Cost** of a double incandescent light lamp, with cast steel cylinder for aerating Kerosene to 70lbs. (usual pressure), with all conducting tubes, stop cocks, fixed, £20..

Consumption, 4 gallons " Silver Light " oil per week — 2/6.
30 hours at 1d. per hour.

Total including cost of mantles and breakages, 3/6.

I used one of the above lights for two years at Brisbane with success.—C. E. Mayes.

The above lights are self-contained ; can be fitted with all necessary street lamp posts, with chamber in base to contain generator of gas cylinder.

Being very heating, it is most suitable for outdoor lighting, but is also fitted for halls, public baths, and private dwellings in which it can be arranged to include cooking stoves, being on the same principle as the " Primus " stove.

Square street lamps, 22/6 ; lamp cages and ladder rest, 14/–.
Fixing posts to be added.

## "LUX" LIGHT.

Lux Light is a kerosene oil incandescent gas light, from 200 to 1500 c.p., similar to the Kitson light .. .. .. .. £12 to £20

700 c.p. consumes 1 gallon of "Sunlight" oil in 16 hours.

Small cast iron cylinders, charged with carbonic acid gas, are used to aerate the gas.

Supplied at depot throughout the State of N.S.W., at 3/- per charge, to last 400 hours.

The power passes through automatic oil feed regulator, along wire pipes to light.

## THE 20TH CENTURY LIGHT CO.

Plant for Lighting, Heating and Cooking.

Said to burn 96 per cent. of air and 4 per cent. of Naphtha. Suitable for homesteads, churches, canning factories. Said to be cheaper than coal gas or acetylene, and not dangerous.

It gives a brilliant white light when used with small incandescent mantles, and a blue vaporous heat when used for stoves.

The installation is very simple, and was exhibited at Sydney Annual Agricultural Exhibition, 1907.

| | | | |
|---|---|---|---|
| **Plant,** 10 lights, 50 candle power, £25; 20 light, £35; 30 lights, £40; 50 lights, £55; and 100 lights plant .. | 80 | 0 | 0 |
| **"Sunlight"** Oil Lamp, 100 c.p., plain stationary iron frame | 2 | 7 | 6 |
| Raising or lowering, extra .. .. .. .. .. | 0 | 12 | 6 |
| Costs ½d. per hour to burn. | | | |
| **Kerosene Incandescent Lamp, Twencent Burners,** brass, complete, 12/6; nickel .. .. .. .. .. | 0 | 13 | 6 |
| Hanging lamps, complete with Twencent burner, chimney, &c. .. .. .. .. .. .. | 1 | 8 | 6 |
| **Incandescent Gas Burners,** from, each .. .. 1/3 to | 3 | 0 | |
| **Holland Arc Lamp,** 1 light, black enamel, complete .. .. | 2 | 8 | 0 |
| **Arc Lamps, "Scorcher,"** black enamel, with reflector, pendant, oval glass, can be used for acetylene gas, from .. 28/- to | 4 | 10 | 0 |
| **Self Intensifying High Power** outdoor Kerosene Lamps, 210 c.p. .. .. .. .. .. .. 65/- to | 9 | 0 | 0 |
| Ditto, indoor series, from .. .. .. .. 35/- to | 6 | 0 | 0 |
| **The "Graetzin,"** inverted gas burner, 100 c.p., with mantle and opal or clear globe .. .. .. .. .. | 0 | 8 | 6 |

## INTERNAL USE.

| | | | |
|---|---|---|---|
| 200 c.p. **Triple Inverted Mantle,** pendant, each .. .. .. | 3 | 5 | 0 |
| Burns 3ft. per hour. Mantles, 10d. each. | | | |
| **High Power** Incandescent Gas lamps, 1000 c.p. "Mammon," Consumption 18ft. gas per hour. Mantles, cost 2/9 ea... | 6 | 5 | 0 |
| 800 c.p., £5; 600 c.p. .. .. .. .. .. .. | 4 | 0 | 0 |
| 400 c.p. .. .. .. .. .. .. .. | 4 | 0 | 0 |
| Mantles, for latter, each .. .. .. .. | 0 | 1 | 6 |

For external use above 400 c.p., owing to the heat generated,

## HEATING.

| | £ | s. | d. |
|---|---|---|---|
| Phoenix Kerosene Heating Stove, red chimney, 31in. high .. | 1 | 7 | 0 |
| Perfect Kerosene brass lamp, 27in. high .. .. .. | 1 | 1 | 0 |
| Hannan's Kerosene Warming Stoves, portable .. 20/– to | 1 | 10 | 0 |
| Welsbach **Gas Radiators,** from ½d per hour gas .. 33/– to | 4 | 1 | 0 |
| Matador Radiator, 30in. high, by 15in. dia., Kerosene, with ruby wired chimney .. .. .. 25/–, 27/– | 1 | 14 | 0 |
| Gas Water Heater. American manufacture, " Eagle," No. 20, nickel plated, 24in. high x 7in. dia. .. .. 7/10/– | 10 | 0 | 0 |
| Patent Water Boilers, for wood or fuel, rate of 2 gallons boiling in 5 minutes .. .. .. .. £3/10/– to | 7 | 10 | 0 |
| Hannan's Water Heaters, for wood fuel, chips, or paper, 1 gal. to 3 gals. per minute .. .. .. .. £4 to | 7 | 10 | 0 |
| Hannan's Heater, for gas, for high pressure and low pressure water supply .. .. .. .. .. £5 to | 6 | 0 | 0 |
| Fletcher's " Spray," 2 gals. per minute to 120 degrees .. | 3 | 10 | 0 |
| Ditto, 3 gals. per minute to 120 degrees .. .. .. | 4 | 10 | 0 |
| Ditto, with shower attachment .. .. .. .. .. | 5 | 10 | 0 |

Made in copper. If in iron, 20/– cheaper.

## STOVES AND OVENS.

| | | | | | | |
|---|---|---|---|---|---|---|
| Patent Royal Ovens and Fire Stoves, for indoor or outdoor use, for wood or coal fuel, under top plate, in six sizes, No. 3 size, 36″ x 18″ x 27″, 90/– ; with boiler attached .. | | | | 6 | 0 | 0 |
| Colonial Ovens | 21 x 12 x 16 deep .. .. .. | | | 0 | 12 | 3 |
| | 27 x 14 x 16 „ .. .. .. | | | 0 | 16 | 9 |
| | 30 x 18 x 18 „ .. .. .. | | | 1 | 2 | 0 |
| | 36 x 18 x 18 „ .. .. .. | | | 1 | 7 | 0 |

The above, with side hobs, in iron, extra, 2/6.
Add for setting above, from 10/– each.

**Gas Cooking Stoves**—

| | | | | |
|---|---|---|---|---|
| " The Main," from .. .. .. .. .. | 3 | 12 | 6 | |
| " Eureka " .. .. .. .. .. | 6 | 15 | 0 | |
| " No. 2 Raleigh," " New Paragon " .. .. .. | 8 | 10 | 0 | |

**Ward's Stoves.**—*See* advt. page 18.

| | | | | |
|---|---|---|---|---|
| " Waratah," " Dover," " Lighthouse," " Mistress," &c. | | | £3 to | £4 |
| Juleff's Emu Stoves, No. 4, | 33 x 19 x 24 .. | 6 | 10 | 0 |
| Leamington Ranges | 48 x 30 x 21 .. | 12 | 7 | 6 |

**Portable Coppers,** with seamless copper and cast iron frame—

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10 gallons | 19in. .. | 3 | 3 | 0 | 16 gallons | 21¾in. .. | 4 | 5 | 0 |
| 12 „ | 20in. .. | 3 | 10 | 0 | 18 „ | 22¾in. .. | 5 | 0 | 0 |
| 14 „ | 21in. .. | 3 | 16 | 0 | 20 „ | 23¾in. .. | 5 | 15 | 0 |
| | | | | | 25 „ | 25in. .. | 7 | 10 | 0 |

## ARMOURED SLIDING DOORS.

**Fitted with Patent Self-closing Apparatus.**

These are made of three or four thicknesses of timber (according to size of opening), and are completely covered with Tinned Steel Sheets, put on in such a manner that, whilst free to expand, they exclude the air and cannot become detached.

By excluding the atmosphere from the wood combustion is prevented, an exposure of several hours to the flames only resulting in the timber becoming carbonised to the depth of a fraction of an inch.

## PAT. WIRE GAUZE FIRE RESISTING SHUTTERS.

The principle of the Miner's Davy Safety Lamp suggested the use of wire gauze for the protection of openings against fire from an adjoining or opposing building.

This idea proved itself in the great Melbourne fire of November, 1897, when the Mutual Stores, which throughout were fitted with the Automatic Sprinklers, and the windows protected by Wire Gauze Shutters, alone withstood that terrible conflagration, which destroyed the entire surrounding block of warehouses. Made to any size or shape.

| | Prices : per sup. ft. |
|---|---|
| Fire **resisting doors,** up to 35 sup. ft., from .. .. .. | 0 3 0 |
| Ditto, shutters (same principle), from .. .. .. .. | 0 3 0 |
| Wire gauze shutters, on iron frame .. .. .. .. | 0 3 9 |
| Ditto, including erection .. .. .. .. .. | 0 4 6 |
| Wire glass windows, in iron frame, including erection .. .. | 0 7 6 |
| **Labour erection** of doors and windows, each, from .. .. | 1 10 0 |
| Fittings, each door, sliding or hung, from .. .. .. | 2 15 0 |
| Automatic attachments, from .. .. .. .. .. | 1 0 0 |

## FIRE SPRINKLERS.

The " **Grinnell** " Automatic **Sprinkler** and **Fire Alarm.**

The **" Morris " Sprinklers,** with external fitted temperature bar.

The **" Grinnell " Drenchers,** and **" Acme "** ditto for roof, or window.

Prices for Sprinklers, and Drenchers from £2 per point upwards, according to plan of building and distribution of sprinklers.

One sprinkler has the recognised covering capacity of 100 sup. feet.

Prices and further particulars on application to their respective agents. *See* advertisements, pages 10 and 26.

**The Simplex Portable Chemical Cylinder.**

Price with tap or hose, 3-gal. size, including one charge of soda bi-carb and sulphuric acid, £3/5/–. Useful for isolated buildings.

**The Sentry Fire Tank,** with 6 buckets and one chemical charge .. 3 15 0

**The 20th Century Chemical Fire Extinguisher Cylinder,** tested to 350lb. pressure. Made in copper. Size, 2ft. x 6in. dia. 3 10 0

Agents : 90 Pitt-street, Sydney.

Buildings fitted with above appliances are allowed a liberal discount off premiums of 20 per cent. by Insurance Companies throughout Australia.

# IRONMONGER.

**Steel Wire Nails**—per cwt.

Flat chequered or small diamond heads—

| Gauges | 4 to 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| Per case | 14/– | 14/6 | 15/– | 15/6 | 16/6 | 17/6 |
| Gauges | 13 | 14 | 15 | 16 | 18 | 20 |
| Per case | 18/6 | 19/6 | 22/– | 24/– | 5d. lb. | 6d. |

**Square Deck-Head Spikes,** per cwt.—

| Sizes | | | 5 x ⅜ | 6 x ⅜ | 7 x ⅜ | 8 x ½ |
|---|---|---|---|---|---|---|
| Black | | | 23/– | 22/6 | 22/– | 21/6 |
| Galvanised | | | 28/– | 27/– | 25/– | — |

**Round Contractors' Spikes**—per cwt.—

Black, Plain, 6 x ⅜in., 24/–; Black, Jagged, 7 x 7-16 in., 25/–

**Black Eared Dog Spikes**—per cwt.—

| Sizes, inches | 2½ x 5-16 | 2½ x ⅜ | 3 x ⅜ | 3½ x ½ | 4 x ½ |
|---|---|---|---|---|---|
| | 30/– | 29/– | 21/– | 20/– | 20/– |

**Cut Nails,** per lb., 3d. Galvanised, per lb. 0 4

**Tramway Spikes,** 2½ x 5-16, per cwt., 19/6; per lb. 0 2½

**American Finishing Nails,** in 1lb. packets 4d. to 8d.

**Steel Wire Brads,** in ¼lb. packets 0 1½

Ew-banks Nails, black, per cwt., 20/–. Galvanised, per cwt. 25 0

Copper Staples, per lb. 1 3

Galvanised Steel Staples, per lb. 0 3

Galvanised Wrought Iron Staples, per lb. 0 4

**Galv. Roofing Nails,** 2 and 2½ inch, per cwt., 40/–; per lb. 0 6

**Lead-Head Roofing Nails,** 2in., to 2½in., per cwt., 25/–; per lb. 0 3

**Galv. Springhead Roofing Nails** (OE 1), in packets of 100 per 100 0 8

**Zinc Slate Nails,** 1½ and 1¾ inch, per cwt., 54/–; per lb. 0 6

**Galv. Slating Nails,** 1½in. x 1¼, per lb. 0 4½

**Galv. CSK Head Clout Nails,** 1 to 2 in., per lb. 6d. to 0 7

**BLUED DOUBLE-POINTED TACKS** (100 in packet)—

| No. | 8 | 10 | 12 |
|---|---|---|---|
| Per doz. packets | 8d. | 9d. | 10d. |
| Per packet | 1d. | 1d. | 1d. |

**Cut Copper Tacks,** in 1-lb. packets—

| Inches | ½ | ⅝ | ¾ | ⅞ | 1 |
|---|---|---|---|---|---|
| Per packet | 1/3 | 1/3 | 1/3 | 1/2½ | 1/2½ |

**Copper Slating Nails,** ⅞in. and 1in. x 16 gauge 1 4

**Linoleum Tacks,** ⅝ x 16 and ¾ x 16, per lb. 0 3½

**Galv. Tank Rivets and Washers,** 5-16 x 3-16 in., ⅜ x ¼ in., per 7lb. packet, 2/6; per lb. 0 4½

**Copper Rivets and Washers,** in 1lb. packets 1 2

Gold's Roofing Screws, 1¾", per packet of 100 0 9

Galvanised Roofing Screws, 7lb. packets—

1½in., 3/–; 1¾in. and 2in. 2 10

2½in, 2/9; 3in. 2 8

**Galvanised Roofing Bolts and Nuts and Washers,** per doz. .. 0 4
Galvanised Iron Washers, per lb. .. .. .. .. 0 4½
**Lead Washers,** in 28lb. bags, per lb., 3½d. ; per cwt. .. .. 28 0
**American Hand-rail Screws (OE 1a),** 4in., 2½d. ; 5in., 3d ; 6in... 0 4

**Iron Wood Screws, Nettlefold's—**

| Length. | Gauge. | Per gross packets. |
|---|---|---|
| ⅜ to ⅝ | 1 to 8 | 3½d. to 5½d. |
| ¾ ,, 1 | 4 ,, 12 | 5d. ,, 8d. |
| 1¼ ,, 1½ | 6 ,, 14 | 6½d. ,, 1/1 |
| 1¾ ,, 2 | 9 ,, 18 | 9½d. ,, 1/11 |
| 2½ ,, 3 | 10 ,, 18 | 1/1 ,, 2/11 |
| 3½ ,, 4 | 14 ,, 22 | 2/4 ,, 5/2 |

**Nettlefold's Brass Wood Screws—**

| Length. Inches. | Gauge. | Per gross packets. |
|---|---|---|
| ⅜″ and ½″ | 1 to 6 | 9½d. to 11d. |
| ⅝ and ¾ | 2 ,, 10 | 10½d. ,, 1/9 |
| 1in. | 6 ,, 12 | 1/6 ,, 2/8 |
| 1¼ to 1½ | 8 ,, 12 | 2/2 ,, 3/8 |
| 1¾ to 2½ | 10 ,, 14 | 3/6 ,, 7/– |
| 3 to 4 | 12 ,, 18 | 7/8 ,, 15/3 |

**Sash Line,** per knot of 12 yards each—

| No. .. | 1 | 7 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Flax .. | 6 | 7 | 8 | 10 | 1/– | 1/2 | — | — | — |
| Sup. Flax | 10 | 11 | 1/3 | 1/7 | 1/11 | 2/3 | 2/4 | 2/9 | — |
| Fine Twine | 11 | 1/– | 1/6 | 1/10 | 2/3 | 2/6 | 3/3 | 3/6 | — |
| Bded. Cot'n | — | — | — | — | — | 1/6 | 1/9 | 2/– | — |

3/16 **Flexible Steel Rope,** per 100 feet .. .. .. .. 7 6

*See* COPPER ROPE, INDEX, METAL.

Linen **Blind Cord,** per knot, 3 doz. yards .. .. .. 1/2 to 1/4
Flax Venetian Blind Cord, ditto .. .. .. .. 1/3 to 1/9
Venetain Ladder Tape, per doz. yards .. .. .. .. 2/3
Carr's Best Duck Tape, per doz. .. .. .. .. .. 3/6
Venetian Blind Actions, per doz. .. .. .. .. 2/3

## SASH FURNITURE.

**Cast Iron Sash Weights,** 3 to 24lbs., per cwt. .. .. .. 8 0

## AXLE PULLEYS.

Light Iron-frame pulleys, 1½ in., per doz. .. .. .. 1 3
Iron-faced, secret, Kenrick's, 1¾in., per doz. .. .. 2 2
Brass-faced, secret, Kenrick's, 1¾in., 3/3 ; 2in., 4/3 ; 2½in. 7 0
Electro Bronze, secret, Kenrick's, 1¾in., 3/– ; 2in. .. 3 6
Brass **Long** Arm **Hooks** .. .. 7/–, 9/6, 10/6, 14/–, 18 0
**Sash Fasteners,** upwards from .. .. .. .. .. 6 0
Sash Lifts, per pair, from .. .. .. .. 6d to 1 6

## WINDOWS, CASEMENTS, FANLIGHT.

### PULLEYS.

| | | | | | |
|---|---|---|---|---|---|
| Awning Pulleys, Galv. Inches .. | 1 | 1¼ | 1½ | 2 | |
| Each .. .. .. | 3d. | 4d. | 5d. | 9d. | |
| Lazy Pulleys, japanned, each .. | 3½d. | 4d. | 5d. | 7d. | |
| Screw Pulleys, japanned, each .. | 2½d. | 3d. | 3½d. | 5d. | |
| Upright Pulleys, each .. .. | 2½d. | 3d. | 3½d. | 4½d. | |
| Side Pulleys, japanned— | | | | | |
| Single .. .. .. .. | 2½d. | 3d. | 3½d. | 4½d. | |
| Double .. .. .. .. | 4½d. | 5d. | 6d. | — | |
| Double Upright Pulleys, each .. | 4½d. | 5d. | 6d. | 8d. | |

**Sash Pivots,** japanned, 2¾in., per doz. pairs .. .. .. 2 0
Brass ditto, per pair .. .. .. .. .. 1/– to 1 4
Brass ditto, per pair .. .. .. .. .. 1/– to 1/4
Brass Casement Stays, 10in., 1/5 ; 12in., 1/7 ; 14in., 1/7.
Bronzed ditto do., 10in., 10d. ; 12in., 11d. ; 14in., 1/2.
Preston's Fanlight Openers, 20in. x ¼in. .. .. .. 7/6
Cartland's Invisible ditto, to work with cords, Iron, 3/– ; Brass, 4/7
**Bronzed Casement Stays,** 10in., 10d. ; 12in., 11d.
**Blacket Pat. Sash Cord Plates,** set of 4 .. .. .. .. 1/–

## AUSTRAL PATENT WINDOW BALANCE.

With Gun-Metal Plates.

Steel lacquered, stock sizes, per set, 13in., 8/– ; 16in., 10/6 ; 18in., 12/6.
**Bronzed Fanlight Lifters,** 3ft. x ¼, 10d. ; 4ft. x 5/16, 1/6 ; 5ft. x 3⅛, 1/9.
**Preston's Fanlight Openers,** 15 x ⅜ .. .. .. .. 4/6
**Venetian Blind Actions** (Check), per doz. .. .. .. 2/6

## HINGES.

Tee Hinges, japanned, per doz., without screws, 6in., 2/2 ; 12in., 3/6 ; 18in., 6/9.
**Tee Hinges,** Heavy Scotch, self color, without screws, per doz., 12in., 8/6 ; 14in., 10/6 ; 18in., 16/– ; 24in., 23/6.
**Gate Hinges,** japanned, with hook to drive, 12in., 1/4 ; 18in., 2/3 per pair
**Gate Hinges,** hook on plate, 12in., 1/7 ; 18in., 2/4 ; 24in., 4/4.
Ditto, with hook to bolt through post, 12in., 2/– ; 18in., 3/– ; 24in., 4/6.
Extra Heavy Strap Hinges, per cwt., .. .. .. .. 28/–
Spiral Springs, japanned, each .. .. .. .. 1/– to 3/–

### BUTT HINGES.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cast Butt Hinges, Inch.. | 1½ | 2 | 2½ | 3 | 3½ | 4 | 5 |
| Per doz. | 1/1 | 1/6 | 2/– | 2/6 | 3/3 | 4/8 | 8/6 |
| Cast Parliam't Hnges. In. | 3 | 3½ | 4 | 4½ | 5 | 5½ | 6 |
| Per doz. .. .. | 6/6 | 8/3 | 10/– | 12/– | 14/– | 15/6 | 17/6 |
| Wrought Back Flaps. Inches .. | 1 | 1¼ | 1½ | 1¾ | 2 | 2½ | |
| Per doz. pairs .. .. | –/10 | 1/– | 1/3 | 1/5 | 1/8 | 3/9 | |

Japanned Spring Hinges, 3in., per pair .. .. .. ..7d., 8d.

### Door Hinges, Springs and Checks.

Helical Door Springs, 4in., 2/1 ; 5in., 2/6 each.
Helical Spring Hinges, iron, 3in., 4/3 ; 4in., 6/3 ; 5in., 9/- per pair, double action.
3in. Screen door Spring Hinge, 7d. ; double action, 1/3.

| Brass Pin, Inches | 2 | 2½ | 3 | 3½ | 4 |
|---|---|---|---|---|---|
| Per doz. pairs | 4/- | 6/- | 10/- | 14/3 | 28/- |
| Steel Washered, per pair | 2/6 | 3/- | 3/6 | 5/10 | |
| Brass Back Flaps, per doz. pairs | 1in., 4/2 ; | 1¼in., 5/7 ; | 1½in., 6/6 | | |

CARTLAND'S DOUBLE ACTION SPRING HINGES.

| Iron Inches | 4 | 4½ | 5 | 6 |
|---|---|---|---|---|
| Per pair | 6/- | 7/- | 8/- | — |
| Rule Joint Hinges, per pair | 2/2 | 2/4 | 2/9 | 3/9 |

**Smith's Patent Spring Hinge,** each 20/-, 25/-
Invisible Spring Hinge, each 32/6
Floor Spring and Check, for 1¾" door, each 80/-

DOOR CHECKS.

"Eclipse" Door Spring and Atmospheric Check, Tuscan Bronzed—
For Light Doors, each 13/6
For Medium Doors, each 16/-
For Heavy Doors, each 19/6
"Norton" Door Spring and Atmospheric Check, Nickel-plated—
For Ordinary Doors, each 20/-
For Heavy Doors, each 24/-
"Blount" Door Spring and Liquid Check—
No. 1, for Light Doors, each 12/6
No. 2, for Medium Doors, each 17/6
No. 3, for Heavy Doors, each 21/-

### PADLOCKS.

HOBBS' PADLOCKS.

Galvanised, 2in., 2½in., 4/6 ; 3in. 6/9.
Japanned, 2in., 4/- ; 2½in., 4/6
Brass, 2in., 7/6 ; 2½in., 10/6 ; 3in., 12/6.
(Extra Keys, 1/- each.

ENGLISH GALVANISED PADLOCKS.

Warded, each, from 0 6
Lever 1/3 to 3/-

**Japanned.**

Warded 0 6
Lever 1/3 to 3/-

YALE PADLOCKS, GUNMETAL—With 2 Keys.

| 1in. | 1¼in. | 1½in. | 1¾in. | 2in. | 2¼in. | 2½in. |
|---|---|---|---|---|---|---|
| 2/9 | 3/- | 3/6 | 4/- | 4/6 | 5/6 | 7/6 |

(Extra Keys, 1/- each.)

## LOCKS.

### LATCH LOCKS.

Yale, 5/– and 5/6 each. 3 keys ; extra keys, 1/– each.
Sargent's, 4/9. 3 keys.
English Latches, 1/6, 2/–, 2/9 each. 2 keys.
English Lever Latches, 3/–, 3/6, 4/6 each. 2 keys.
Hobbs' Latches, from 8/6 each. Extra keys, 1/– each.
Hobbs' Locking Latches, from 10/6 each. Extra keys, 1/3 each.
American Latches, with 2 flat keys, 1/3, 1/6, 1/9, 2/– each. Extra keys, 6d. each.

### RIM LOCKS.

Carpenter's, complete with furniture, J14, 2/9 each ; 30/– per doz.
Ditto, 6in., 3/9 each, 41/– doz. ; 7in., 4/3 each, 49/– doz.

Vaughan's, 6in., 2/– each, 23/6 doz. ; 7in., 2/10 each, 31/– doz.
(Extra Rim Keys, 6d., 9d., 1/– each, according to size.)
American Rim Locks, from 9d. each ; 8/9 per doz.

### DRAW-BACK LOCKS.

Carpenter's, 7in., 4/–, 4/6 ; 8in., 5/–, 5/3.
Vaughan's, 7in., 3/3, 3/9 ; 8in., 3/6, 4/3. Extra keys, from 9d. each.
American, 6in., 3/3 each.

### DEAD LOCKS.

Hobbs' Lever, from 14/–. Keys, 1/3 each.
English, 4in., 1/– ; 5in., 1/3 ; 6in., 1/6 each.
American Locks, 3in., 8d. ; 4in., 1/– ; 5in., 1/3 ; 6in., 1/6.

### MORTICE LOCKS (without Furniture).

English Iron Bolts, 1 key, 5in., 1/6 each ; 15/6 per doz. ; 1/9 each, 19/– per doz. ; 6in., 2/3 each, 25/– per doz.
Brass Bolts, 1 key, 5in., 1/9 each, 20/– per doz. ; 2/– each, 22/6 per doz. ; to 4/6 each, 51/– per doz.

### AMERICAN MORTICE LOCKS.

3½in., 10d. each, 9/6 per doz. ; 1/6 each, 17/– per doz.
4in., 1/6 each, 17/– per doz.
Full Rabetted Mortice Locks, 5in., 6/– and 6/6 each.

### SASH LOCKS.

Sash Mortice Locks, 1½in., 2/6 each ; 1¾in., 2/9 ; 2in., 3/– each.
Sash Mortice Locks, half rabetted—1¾in., 3/– ; 2in., 3/3 ; 2½in., 3/6 ea.
Ditto, Full rabetted—1¾in., 5/6 ; 2in., 5/6 each.
(Extra Keys to Mortice Locks, 1/– each.)
American Lock Sets, comprising lock, 2 escutcheons or plates, set furniture, 1 key—from 2/– to 30/– each.
(Keys from 1/– each.)
**Brass Cabin Locks,** from 8/– each. Brass Keys, 1/3 each.
**Elevator Locks,** 7/6 each.

## FURNITURE.

**Brass Rim,** 5in., 6d. ; 6in., 6d. Milled Edge, 6in., 1/–, 1/3 ; 7in., 1/3, 1/6 ; 8in., 1/3, 1/6 per set.

**Brass Mortice Furniture**—Plain, 1/6 per set. Milled Edge, 1/8 to 4/– per set.

**Crank**—Plain set, 1/3 ; Milled Edge, 1/6, 2/6 per set.

American Mineral Rim Furniture, 6d. set., 4/9 per doz.

China Rim Furniture, white and gold, 1/9 per set ; black and gold, 1/9 per set ; 18/– per doz.

Glass Rim Furniture—Moulded crystal, 7/– ; Cut Crystal, 7/6 ; Cut Amber, 8/6 per set.

China Mortice Furniture—White, 1/3 per set ; white and gold, 1/9, with brass roses, 2/– per set ; black, 1/6 per set ; black and gold, 1/9 set.

Glass Mortice Furniture—Moulded Crystal, 7/3 per set ; Cut Crystal, 8/6 per set ; Moulded Amber, 7/6 ; Cut Amber, 9/– per set.

Wood Furniture—2/–, 2/3, 3/–, 3/6, 4/– per set.

**Finger Plates**—

Wood, 2/3, 2/6, 2/9, 3/–, 4/– per pair

Brass, 1/3, 1/6, 2/– to 6/– per pair.

China, 1/9, 2/6, 3/6 per pair.

China, Hand-painted, to 15/– per pair.

Glass, 7/– to 16/– per pair.

Steel, 1/– per pair.

**Cupboard Locks,** japanned, 2in. to 4in., 6d. to 1/– each.

Lever, 2in., 9d. ; 4in., 1/3 each.

**Hobbs' Japanned Cupboard Locks,** from 2/6 to 3/6 each.

**Brass Cupboard Locks, Straight,** 1in., 9d., 1/– ; 1½in., 1/–, 1/3 ; 2in., 6d., 9d., 1/–, 1/3 ; 2½in., 9d., 1/–, 1/3 to 2/– ; 3in. and 4in., 9d., 1/– to 2/– each.

## DOOR ROLLERS AND HANGERS.

Japanned Iron Sheaves—

| Inches | 2 | 2½ | 3 | 3½ | 4 | 4½ | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Each .. | 2d. | 2½d. | 3d. | 4½d. | 6½d. | 9d. | 1/– | 2/– |

Barn Door Hangers, No. 14, 2/– ; No. 15, 2/6 per pair.

Ditto do. Lane's, No. 40, 2/9 ; No. 50, 3/3 per pair.

Bottom Rollers, 4in., 1/4 ; 5in., 1/10 per pair.

Hatfield's Patent Door Hangers, wrg. steel—

| To run ft. .. | 2½ | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Each, with bolts .. | 2/10 | 3/2 | 4/10 | 6/10 | 8/10 | 12/3 | 16/– |

Hatfield's Patent Door Rollers—

| To run, ft. .. | 2½ | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Each, with bolts .. | 3/6 | 4/3 | 6/10 | 9/6 | 12/3 | 16/– | 20/– |

Kenrick's Pat. Anti-Friction Hangers, to run on iron bar—

To run 2 ft., 3/– ; 3 ft., 4/6 ; 5 ft., 9/6 each.

Kenrick's Wrought Iron Cheek, to run 6 ft., for Store door, 9/– each.

McCabe's Pat. Ball Bearing Door Hangers, for Slide Doors—

For single doors, 3ft. opening, 16/9 ; 4ft., 22/6 per set.

Double doors, sets, 6ft. 6in. opening, 33/6 ; 8 ft. opening, 40/–.

## KNOBS, KNOCKERS, BOLTS.

Glass Centre Door Knobs, Crystal, 4/9, 6/6 ; Amber, 5/3, 7/–
Brass Centre Door Knobs, Steel B. & R., 2/–, 2/3, 3/6, 4/–, 4/6, 5/–, 6/–
China Centre Door Knobs, 1/3, 1/5, 1/9
Brass Door Knockers, Steel B. & R., 2/2, 2/4, 3/3, 3/6, 4/–, 5/3, 5/10
Brass Postal Handles, Steel B. & R., 4/–, 4/6, 5/3, 6/–
Letter Box Plates, 10d., 1/9, 1/11, 2/–, 2/6, 3/3

### BOLTS.

| | | | | | |
|---|---|---|---|---|---|
| Brass Knob Barrel Bolts— Inches .. | | 3 | 4 | 5 | |
| Each .. .. .. .. .. | | 2½d. | 3d. | — | |
| Necked, each .. .. .. .. | | 3d. | 3½d. | 4d. | |
| Japanned Tower Bolts— | 4 | 5 | 6 | 8 | 10 ins. |
| Doz., without screws | 2/9 | 3/6 | 4/3 | 5/6 | 7/– |
| Japanned Barrel Bolts, with Brass Knob— | | | | | |
| Inches .. .. .. .. .. | | | 6 | 8 | 10 |
| Doz., without screws .. .. .. | | | 5/– | 6/9 | 8/3 |

Japanned Chain Bolts, 6in., 8d. ; 8in., 10d. ; 10in., 1/3 each
Tokio Bronze Chain Bolts, 3in., 1/– ; 4in., 1/1 ; 6in., 1/3 each.
Berlin Black Spring Bolt, 8in., 2/– ; 10in., 2/6 ; 12 inch., 3/– each.
Eye Bolts, to screw, ½in., 4d. each.
Ditto, nutted, 6in. x ½in., 5d. each.
C.V. Centre Door Knobs, 6d., 7d., 8d., 10d., 1/– each
C.V. Centre Door Knockers, 10d., 1/–, 1/3, 1/5, 1/8 each.

## BLINDS.

**Venetian Blinds,** for inside use, painted any colour, mounted with Carr's Best Patent Ladder Tapes and best linen cords, fitted with patent check action, per ft. super., 6d. to 9d.

Sizes under 12 super. feet charged as 12 super. feet.

**Venetian Blinds,** outside use, fitted with iron rods and facia boards, Carr's best tape and linen cords ; painted any colour, 10d. to 1/–.

Sizes under 14ft. charged as 14 feet.

Stock Sizes, half price ; 7ft. x 3ft. = 7/– per door.

| | Pine. | Cedar. |
|---|---|---|
| Gauze Fly Windows and Doors— | | |
| Fitted with hinges, bolts, and locks, unpainted .. | 7d. | 8d. |
| Varnished .. .. .. .. .. .. | 8d. | 10d. |
| Polished .. .. .. .. .. .. | 9d. | 11d. |
| Inter Gauze Wire and Perforated Zinc Screens, Cedar polished .. .. .. .. .. .. | 2/– to 3/– | |

| | Per ft. sup. s. d. |
|---|---|
| Canaletti blinds, linen tick, in panelled and moulded cases, painted complete .. .. .. .. .. .. | 2 0 |
| Florentine blinds ditto do. .. .. .. .. | 2 3 |
| Spanish blinds ditto do. .. .. .. .. | 2 6 |
| Oriental blinds, for circular-headed windows ditto .. .. | 3 0 |
| Hartshorn's Spring Shade Roller, 42in. x 1in. dia. .. .. | 0 7½ |
| 48in. x 1¼ ,, .. .. | 1 0 |
| 60in. x 1½in. .. .. | 2 3 |
| Holland, for window shades, 3ft. wide, per yard, 6d. to | 1 3 |
| Ready Made Blinds, with rollers, 3ft. x 6ft. long .. 3/6 to | 7 0 |

# ARTESIAN BORING, DIAMOND AND MACHINE DRILLING.

## BORING FOR WATER.

The great success attending the results of artesian well-boring (both Government and private contracts) during the last 15 years throughout Australia, and the improved methods for boring, has reduced the problem of boring in numerous districts from a speculation to a comparative certainty.

The different State Governments, particularly N.S.W. and Queensland, owing to the large expanse of Tertiary and Crotaceous country of recent formation, have bores sunk along the numerous stock routes, in some instances only 15 miles apart (a day's travel for stock).

The Shire Councils sink bores for the combined selectors' water supply in different districts. The cost is divided in some instances, or a fee is charged, directly or indirectly, for the benefit derived. Owing to the limited and uncertain rainfall, at least one-half of Australia must ultimately depend upon its water supply from artesian wells. The maps of Australia show that the N.W. portion of New South Wales, as well as the interior between the Lachlan and Darling Rivers, are destitute of rivers : this is also the case with the S.W., West and interior of South Australia, and the interior of Western Australia, extending to the Great Australian Bight on the South Coast. The rainfalls of these vast areas do not find their way to the sea, but end in lakes, swamps, and underground streams, leading to immense basins with impervious beds, which only have to be tapped to bring the water to the surface. In many cases, salt water has to be passed through before fresh water is obtainable. This is shut off by enclosing the bore hole with iron tubes, or casing.

The more simple methods of obtaining water, at shallow depth, are the following :—

### Tube Wells.

*Norton's Abyssinian Tube Wells* are portable, light, simple, cheap and effective ; to obtain water for camping or household purposes, or for trial holes where a larger supply is required. The apparatus includes 28 feet of 1½in. gal. iron pipes, and costs in Sydney only £10, for 2in. pipes, £13/10/– complete ; stronger and larger plants, £50 to £70. The pipe is supported by a wrought iron tripod stand, and driven by an iron monkey. In Christchurch, New Zealand, about two-thrids of the houses have 1½in. malleable iron pipes, or tube wells, driven down about 80 feet, from which a plentiful supply of water is obtained.

These tube wells are for alluvial soils only, and the water obtained must be within 25 feet of the surface, to be raised by the lifting pump provided.

### Australian Water Auger.

When water can be obtained by sinking not more than 200 feet, the above auger may be used. It is an earth auger, and is used in the same way as a carpenter's auger, with screwed iron rods for turning. The apparatus is simple and easily worked, and costs about £250 with tools, casing and appliances to sink 200 feet if required. Sinking under favorable circumstances will progress at the rate of 2ft. per hour for a 5in. auger.

### The Tiffen Borer.

The Tiffen Borer can be successfully worked up to 500 feet, with one horse, one man and a boy. A water supply from an 8in. hole is usually equal to the supply from a well 8 feet in diameter.

This is one of the natural advantages of *boring*, as compared with well-sinking.

After the water supply is obtained, it may be raised at a nominal outlay by a modern wind-pump, into a reservoir, with waste weir.

For irrigation, sheep, or cattle, where the supply is not required to be continuous, and the reservoir is large enough to wait for the wind, these combined means for obtaining a water supply are sometimes sufficient.

### Cost of Machines and Boring in Alluvial Soils.

| | | £ | per foot. |
|---|---|---|---|
| No. 1. | Plant with two 8in. earth augers, horse gear, &c., complete for a depth of 115 feet .. | £110 | 8/– |
| No. 2. | Ditto for a depth of 210 feet .. .. .. | 130 | 10/– |
| No. 3. | do. 306 ,, .. .. .. | 150 | 12/– |
| No. 4. | do. 400 ,, .. .. .. | 170 | 14/– |

If rock is met with, the necessary *drilling attachments* cost about 50 per cent. extra.

The application of the modern oil and gas engine surpasses the old methods, if the initial cost is forthcoming. See Index, PLANT, for prices.

Boring with a 4in. shell auger in the bed of a dry creek to obtain water and test for well sinking, costs from 2/6 per foot to 20 feet. A tripod and horse whip being used to raise and empty auger with debris.

**Prospecting Boring in Small River Gravel, Shoalhaven Alluvial Flats.**

Hand power auger, with portable shear legs, windlass, 3½in. shell and screw augers, 1″ x 1″ square rods.

50 trial bores, 30 to 85 ft. of river wash, shifting 80 yards to each bore. Labour only, cost 1/– per foot. Plant cost £65.

**Boring in felsite,** Burragorang, to 560 feet, with a small steam cable boring plant, for a 6 inch diameter bore. Cost, including a second-hand plant bought for £200, £1120, or £2 per foot deep.

## ARTESIAN WELLS.

The sinking of these wells or bore holes for great depths, by heavy machinery and steam power is generally commenced by boring an 11in. hole as deep as possible.

Into this bore is inserted 10in. wrought iron tube or casing, in lengths of from 4 to 18 ft., with screwed ends. Inside this tube, holes are *jumped* for casings of 8, 6, and 5 in. diam., as required. Each size of casing used is started from the surface, and continued as far as possible.

If the ground is very porous the whole of the casing is left in the bore at completion.

**Bits.**—Every kind of soil or rock met with is pulverised by jumping with edged steel bits, which are turned about 60 degrees, 6 turnings completing the circle in the manner pursued by quarrymen in jumping holes for blasting.

The bits jumped by steam, for boring are from 3 to 4 ft. long. The width of the bits being adapted to the size of casing to be used.

The rock, shale, &c., is reduced with water to the consistency of cream, which is removed by mud or sand pumps, whose outer diam. are at least ½in. less than the bore of the casing, their lengths varying from 5 to 30ft., the lower ends of the sand-pumps have chisel shaped shoes of ⅝ steel, screwed on to the tube or casing, the whole forming the **sand pump.** The shoe is fitted with a valve to open upwards. The tube used for the pump is about ⅛ of an inch thick, with an iron shank and screw to receive the wire rope with swivel by which it is lowered to bottom of bore and raised when full of sand and water, liquid clay, mud, &c.

**Sinkers.**—In sinking, additional weight is given to the chisel bits, by a sinker which is a cylinder of wrought iron screwed on to the bit. The sinkers are from 2¾ to 5ins. diam., and from 12 to 28 ft. in length, in one or two parts.

**Jars.**—To prevent tools becoming jammed, or when jammed to loosen them, a jar is used next to and above the sinker. It is about 5ft. long, and both ends have connecting conical screws.

**Rimers.**—As the boring or drilling proceeds, the casing is lowered to prevent the sides caving in or falling away. There are several kinds of rimers; the fork rimer is about 5ft. long, with two opening spring forks connected with a screwed shank. The lower end of forks are open to the width required, and have chisel edges to scrape or chip off the sides of the hole below the casing, to admit of the casing being lowered: in lifting the rimer, to withdraw it, the spring forks are automatically brought nearer together by pressing against the lower end of casing when entering the same.

**Fishing tools.**—These are tools for recovering sand pump or other tools, &c., inadvertently left in the bottom of the bore, and are of several kinds.

**Rope Spear.**—Is sometimes efficacious when part of the sand pump line and sand pump is left in the bore.

**Steel Tube and oval ring fisher** to recover lost poles by passing over and catching under straps of poles by slightly turning cable.

## SYSTEMS OF BORING.

**The Canadian or Pole System.**—Wooden rods, about 2¼ ins. diam., of the straightest grained canary pine, spotted gum or yellow wood, are connected by iron pole joints with cylindrical screws of Lowmoor iron, and centre straps riveted to the wooden rods (about 18 ft. long) slightly tapered at the ends to receive them. The boring string of tools, viz., bit, sinker and jar, are attached to the rods, and lowered or raised, length by length, 38ft. at a time. a very tedious method in deep bores. Some of the deepest bores have been sunk with this system ; notably, two in the Moree, N.S.W., district,—3765 feet deep at Tulloona, and 4086 feet deep at Dolgelly, were sunk by the author, C. E. Mayes.

By a simple method of shaping and dressing the solid bit, it is used to drill and underrim for casing at the same time,—thus doing away, to some extent, the double cutting of the bore hole, and the unsatisfactory working of spring under reamers.

**The Cable System.**—Steel wire rope for its quickness in extracting and re-lowering tools recommends itself. A driller and an engine-driver, or "wrenchman," is required for each shift, instead of three men by the pole-tool system.

The large main spool for wire rope, called a "bull" wheel, and a smaller sand spool for sand line, are brought under the control of driller by levers and brakes.

The combined system of cable and pole, using from 3 to 5 poles on top of tools, with the cable continued to the surface, and attached to the walking beam is sometimes used.

The walking beam is the lever beam 10 to 25 feet long, used to give the up and down percussion movement to the cutting tools.

**Risks, Accidents and delays.**—With the exception of mining, "Artesian Boring" is probably the most risky in the isolated districts of Australia.

*The risk from broken tools*, or the telescoping of casing, or other unforeseen accidents is great.

**The Fixed Engine** and Boiler has many advantages over the Portable Engine, especially when taken over bad roads. The price and weight of imported Engines and Boilers detached are less than the combination of the two, as in a portable engine. As the teamster has generally to take his waggon or dray with him for return loading, he charges for the full weight of the portable engine with its carriage and wheels, which are broad, and roll the ground on ordinary roads, but when bogged are not so easily released as narrow wheels.

**When water is reached** by boring, it sometimes fails to rise to the surface. In such cases it is pumped up by deep well pumps, if with brass tubes 4ft. 6in. long by 3¼in. diam., having two brass valves for

bottom and top, such a pump would cost about £22. As the pump rods are not liable to torsion, but only subjected to tension, ½ inch galv. iron tubes are sufficient, having been used in one instance in Queensland for a depth of 1760 feet. When the water rises above the surface, it may be shut off with and supply regulated by a valve.

A 10 *nominal horse-power horizontal engine*, cylinder 10in. diam., with 16in. stroke ; revolutions 130 = 260 strokes = 347 feet per minute, pressure of steam per super. inch = 60lbs., weight of the whole, 10cwt., and price, £100. Indicated horse-power = 78.5 × 60 = 4710lbs., and 4710 × 347ft. = 1,614,374 divided by 33,000 = about 48 horse-power ; and yet it is called a 10 nominal horse-power. The boiler to match this engine is 12 h.p., and weighs 76 cwt. Price £175, or with the engine, 86 cwt., price £275.

A *nominal* 10 *horse-power* horizontal engine, the Americans would probably call 15 horse-power.

The indicated horse-power by Watt's formulae is 57 horse-power.

It has 10in. cylinders, 12in. stroke, working pressure 80lbs. per inch, revolutions of crank 150 = 300ft. per minute and 300ft. into area of cylinder = 300 × 78.5 = 23,550lbs. × 80lbs. per inch = 1,884,000 divided by 33,000 lbs., raised 1 foot high per minute, is equal to 57 indicated horse-power.

Weight, 15 cwt.

Boiler for same, 36 cwt.

Total = 51 cwt., price, Sydney or Melbourne, about £300.

**The Nominal Horse-power** allows for every disadvantage that is likely to arise, and might be relied upon to bear 50 per cent. increase in cases of emergency. (*See* Index.)

## HORSE POWER.

### From J. Jaffrey's *Handy Tables.*

A horse power is a conventional term used to denote a measure of work.

It expresses a rate of mechanical work measured in foot lbs. for some unit of time, as one minute.

33,000lbs. raised one foot high in one minute is what is commonly understood to mean a horse power.

$$\text{Indicated horse-power} = \frac{2 \text{ APRS}}{33{,}000}$$

Where A = Area in inches. Where R = Revolutions per min.
P = Average pressure in lbs. S = Stroke in feet.

### Boilers.

To find the Nominal H.P. of Boilers.

Plain cylindrical boilers.

Rule.—Multiply the length by the diameter in feet, and Divide by 6

$$\text{Or. H.P.} = \frac{\text{L} \times \text{D}}{6}$$

**A Simple Method of finding the Horse-power of an Engine.**

P—Steam pressure in lbs. per sq. in. A—Area of piston in inches.
S—Stroke in feet. R—Revolutions × 2 per min.

In a Single Cylinder Engine the horse-power is found as under—

H.P. = P × S × A × R divided by 33,000.

In a single cylinder engine, the horse-power is found as stated ; in a compound engine, the horse-power in the high-pressure cylinder is found, using the pressure of the steam as shown by the boiler gauge, and adding the h.p. so found to that found in the low pressure cylinder, using the steam pressure at the pressure it leaves the high pressure cylinder.

**A Portable or a Stationary Engine** of at least 10 horse-power and which can be worked up to 15 horse-power in cases of emergency is fixed about 20 feet from the bore, and fitted with special gear to enable the drillers to regulate the steam while at work at the bore.

**Water for Engine, &c.**—About 900 cubic inches of water is required per horse-power per hour—3¼ gallons per hour × 24—78 gallons per day, and 78 × 10—780 gallons per day of 2—12 hour shifts for a 10 horse-power engine.

**For camping purposes,** 100 gallons for waste and the use of the men in the camp, making in all 1100 gallons, or nearly five tons of water per day. As the engine is not always at work and seldom works up to its limit, the average would be about 800 gallons per day for a 10 h.p.

For larger boiler and engines, with camp allowance, up to 1500 gallons per day.

**Reservoir.**—When a drought is anticipated, a reservoir must be made at least 40ft. square at bottom, and 80ft. square at top by a depth of 10 ft. at water level, this will hold 37,600 cubic feet of water and will cost from £85 to £100 with the necessary waste weir ; after going to this extra expense, there may not be sufficient rain to fill it in six months, and even if filled it would have to be watched incessantly to prevent it being stolen by quadrupeds or bipeds. The N.W. portion of New South Wales, W. of the Paroo and Darling Rivers is especially liable to drought the annual fall of rain is only 10in. per annum ; the available rainfall being very small and uncertain, so that condensers must be provided in any boring outfit to economise the water used as much as possible. The water hole should be alongside the water course, so that the bulk and rush of flood waters would not destroy it.

**Fuel required.**—About 10lbs. of good pit coal per horse-power per hour is required for a portable engine ; the relative steam producing power of good hardwood as compared with good coal is about one-half, therefore 20lbs. of good hardwood per horse-power per hour would be required, and for a 10 horse-power engine 200lbs. per horse or 4800lbs. for a day of 24 hours, so that at least 2 tons of firewood per day would be used while working two shifts of 12 hours each.

**The Poppet Head** or **derrick,** is a pyramidal frame erected over the proposed bore hole to support the gin wheels over which the wire ropes pass, connecting the spools or drums with the tools, boring rods, &c.

The derrick is sometimes made of Oregon pine, instead of wrought iron ; the general size is 16ft. square at base by a height of 56 ft. with the top 4ft. square ; it is in 7 stories of 8ft. each, and should be built upon hardwood sole plates or sleepers about 10in. x 8in. the Oregon required is, approximately, as follows :—

| | Sup. Feet |
|---|---|
| 4 Standards, 56ft. x 9in. x 2in., and 56ft. x 7in. x 2in., the two forming an anglewood 9in. x 9in. in seven lengths to each standard, butt jointed and fished with Oregon fish plates .. | 600 |
| 28 Bearers, average 9ft. x 8in. x 2in. .. .. .. .. | 336 |
| 28 Diagonals, average 13ft. x 6in. x 2in., only four diagonals to each bay, alternately reversed .. .. .. .. | 364 |
| 24 Joists, 6 x 2 laid flat for flooring, fish plates, &c. .. .. | 308 |
| 4 sleepers for flooring, 18ft. x 10in. x 8in. and top bearers of hardwood .. .. .. .. .. .. .. | 592 |
| | 2200 |

Large beams, obtained near site if possible, 18in. to 24in. diam., are used under floor each side of bore when hydraulic jacks are used to remove casing jambed.

| | £ |
|---|---|
| **Estimate of Complete deep-sinking Boring Outfit.**—Tools, consisting of bits, sinkers, jars, dutchmen, rimers, wrenches and levers, swivels, sand pumps, temper screw, spools, driving wheels, shaft, crank, pin and collar, iron wheels for derrick, steel casing clamps, fishers, 8ft. spud, &c., complete, about .. .. .. .. .. .. .. | 700 |
| Ironwork for timber derrick and rig, including bolts, angle irons, gal. steel wire ropes for sand pumps, steel wire ropes, four 400 gallon iron tanks, blacksmith's and carpenters' outfits, engineer's requisites, belting, &c., about .. .. .. | 130 |
| Labor in erecting timber derrick and rig, taking down same, and cartage to Railway Station .. .. .. .. | 90 |
| Timbers for same, complete .. .. .. .. .. | 40 |
| | £960 |
| E. McCray & Co., make an iron derrick of similar dimensions with timber foundations, for.. .. .. .. .. | £90 |
| Wrought iron rig complete with belt tighteners, hust blocks, walking beam and spring pole for .. .. .. .. | 77 |
| Engine and boiler complete (not portable) but of light pattern, with steam chest .. .. .. .. .. .. | 300 |
| **Weight of Plant,** viz., engine, boiler, rig, derrick, camp equipment, tools, &c., about 15 to 22 tons. .. .. .. | |
| Cartage to and from railway station, and transit by railway to be added, say at £5 per ton .. .. .. .. .. | £110 |

## TUBES FOR ARTESIAN BORES.

In the following table of wrought iron casing, only 10, 8, 6, 5, and 4in. diameter tubes are used for Artesian Bores in the Australian States.

## SWELLED AND CRESSED JOINTED CASING.

Average Price delivered in cities.

| External Diameter .. | 4in. | 5in. | 6in. | 8in. | 10in. |
|---|---|---|---|---|---|
| Thickness of Casing .. | 7/32 | 7/32 | 1/4 | 9/32 | 11/32 |
| Price, per foot .. .. | 2/– | 2/6 | 3/– | 5/– | 8/– |

**To Preserve the Screws** at the ends of the casing, short screwed ends are used.

## TUBES FOR ARTESIAN BORES.

Weight in lbs. per foot of Wrought Iron Casing with swelled or flush joints.

| External Diameter. | Thickness in fractions of an inch | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 5/32 | 3/16 | 7/32 | 1/4 | 9/32 | 5/16 | 11/32 | 3/8 | 7/16 | 1/2 |
| 4 in | 6·3 | 7·5 | 8·7 | 9·9 | ... | ... | ... | ... | ... | ... |
| 4½ in | 7·2 | 8·6 | 9·8 | 11·2 | 12·5 | 13·8 | ... | ... | ... | ... |
| 5 in | .. | 9·6 | 11·1 | 12·6 | 14·1 | 15·5 | 16·9 | 18·4 | ... | ... |
| 5½ in | .. | 10·5 | 12·2 | 13·9 | 15·5 | 17·1 | 18·7 | 20·2 | .. | ... |
| 6 in | .. | 11·5 | 13·4 | 15·2 | 17·0 | 18·8 | 20·6 | 22·3 | ... | ... |
| 6½ in | .. | 12·5 | 14·5 | 16·5 | 18·5 | 20·4 | 22·3 | 24·3 | ... | ... |
| 7 in | .. | 13·5 | 15·6 | 17·8 | 20·0 | 22·1 | 24·2 | 26·2 | 30·3 | ... |
| 7½ in | .. | .. | ... | 19·2 | 21·5 | 23·7 | 26·0 | 28·2 | 32·6 | ... |
| 8 in | .. | .. | ... | 20·5 | 22·9 | 25·4 | 27·8 | 30·2 | 35·0 | ... |
| 8½ in | .. | .. | ... | 21·8 | 24·4 | 27·0 | 29·6 | 32·2 | 37·5 | |
| 9 in | .. | .. | ... | 23·1 | 25·9 | 28·7 | 31·4 | 34·2 | 39·6 | 44·9 |
| 10 in | .. | .. | ... | 25·8 | 28·9 | 32·0 | 35·1 | 38·1 | 44·2 | 50·2 |
| 11 in | .. | .. | ... | 28·4 | 31·8 | 35·3 | 38·7 | 42·1 | 48·8 | 55·5 |
| 12 in | .. | .. | ... | 31·1 | 34·8 | 38·6 | 42·3 | 45·0 | 53·4 | 60·7 |

N.B.—All wrought iron pipes with swelled and crested joints are made to the above and other external diameters, and when used for casing the bore refers to the *Earth bore* to be cased.

## DIAMOND DRILLING.

Notes by James E. Elliott, of The Goldfields Diamond Drilling Co., Ltd.

1907.

During the past year the following mines at Broken Hill have done considerable diamond drilling :—The Broken Hill Propy. ; The British Broken Hill Propy. ; Block 14 ; The Junction ; Block 10 ; The Broken Hill North ; Broken Hill South ; The New White Leads ; The North Extended, and the South Blocks Extended.

The latter mine has an electric drill—power being carried from surface over cables hung in the shaft connected with the drill below.

Bore holes have been used to assist in the drainage and ventilation of mines, and for rope-ways for haulage purposes.

The drill is capable of boring to 1 mile in depth vertical, 1200 feet in length horizontal, and 1500 ft. dipped at an angle of 45 deg. Holes may be drilled vertical up or down, and at any intermediate angle, from any point in the mine workings underground, or from surface and in any direction.

The deflection of bore holes has been almost entirely overcome by recent improvements in the tools and methods used. Bore holes to 300 ft. in length horizontally have been drilled quite straight, so that a lighted candle could be seen from one end to the other.

The " Clinostat " is an instrument used to show deviation of bore, and is composed of a glass tube in which is poised a plummet and magnetic needle immersed in transparent liquid gelatine. It is fitted in a brass tube and lowered to any desired point in the bore hole, the gelatine being then solidified by the use of cold water in contact with the glass tube. Before withdrawing the Clinostat, the plummet will have assumed the vertical, and the needle the meridian ; given these two points as a basis, for calculating, deflection.

By the use of the " Dip Indicator," the direction of dip of strata, reef, or lode may be ascertained.

A drill for 1000ft. weighs 18 cwt., and occupies a floor space of 3ft. 6in. x 6ft. 6in.

For underground boring no derrick is required, a recess in line of borehole, 14ft., is required to work the boring tools.

For **surface boring** to a depth of 2000 ft., a tripod derrick is used, 32 feet high. For a greater depth a higher derrick is used, for the 20ft. rods.

The motive power may be steam or electricity, and for underground boring, compressed air or electricity.

The amount of power for boring to 1000 ft. is from 150 to 240 cubic feet of **free air** per minute, according to depth, or from 20 to 36 amperes at 220 volts if **electric power is used.**

Brazilian Carbon Diamonds, amorphous in structure and extremely hard, are used for boring hard rock.

The price of Carbon during 1906 fluctuated between £10 and £15 per carat. A carat equals 3.17 troy grains.

The Australian Bort is unsuitable for boring hard rock, because of its crystalline and granular structure, which renders it susceptible to fracture. The South African bort is too brittle to be of any use for boring, and Brazilian Ballas, being round and smooth is deficient in the necessary cutting edges.

In rocks of extreme hardness, such as granite, diorite, felsite, and quartzite, from 60 to 100 ft. per week may be drilled, and in rocks of medium hardness, such as slates, schists, indurate sandstones and diabase, from 100 to 150 ft. per week.

The progress decreases as depth is attained by reason of the time necessary to draw and lower the line of tools. Slow progress is often made in fast cutting rocks by reason of the frequent necessity to draw the cores which plug in the core barrel.

Rocks are more favourable to boring when intersected at right angles to the cleavage plans.

The amount of water required to flush the diamond bit depends upon the nature of the rock being drilled. If the rock is reasonably solid the water returns to the sump and is reused ; if the water goes away in crevices, or in permeable stratum, a maximum of 4000 gallons per day of 24 hours may be required ; or 300 gals. if tight strata.

The **cost of boring** ranges between 10/– and 25/– per lineal foot, according to the nature of the rocks to be intersected, and the conditions and cost of power supply and transportation. Cases of cheaper boring may occasionally occur under specially favorable conditions. Boring for quartz reefs or lodes is necessarily more expensive than boring in coal measures or basalt rocks by reason of slower progress and greater carbon expenditure.

## COST OF PLANT.

Landed City Wharves—All States.

Diamond Prospecting Drill, capacity 300 ft. — £200.

Diamond Drill, hydraulic feed, for steam or compressed air power, vertical capacity 1000 feet, or horizontal, 800 ft. — £500 to £700, according to equipment.

## DIAMOND DRILL BORING.

*Extract from N.S. Wales Mining Report.*

### Cost of Boring.

Sandstone and coal measures, 4/– to 9/–.

*Bore at Broken Hill* for minerals through quartzite, granite, diorite, gniess, and mica slate, very hard strata, and destructive on diamonds. Total depth bored, 1122ft., days occupied, 313 ; rate per hour, 5.96 ins. ; cost per foot, 16/–. These costs are exclusive of officers' salaries, rent, &c.

Cost of diamonds used per foot in depth, average from 1/– to 1/7.

## ROCK DRILLS.

Rock drills are used in all the Australian States, for railways, gold and silver mines, road metal quarries, limestone quarries, building stone quarries, &c.

**Jones' Rock Drill,** for **hand power** (Swinden & Co., London). Bowl 60lbs. to 300lbs.—

One man drove tunnel, 7′ 6″ in trachyte, 3ft., in 26 days. Shaft sinking, 9′ x 6′, at 352 level, in trachite.

Two men sunk 13′ 6″ in 52 days.

Price complete on Telescopic Column, f.o.b., £25; with tripod, £26/10/–.

Set of 21 drills and spare parts, extra, £3/8/–.

Cripple Creek, Portland. Report, American Institute of Mining Engineers.

**Baby Drill,** on bar, 2in. cylinder; $\frac{7}{8}$in. steel for starters, $\frac{3}{4}$in. for long drill to 8ft. long; 4 to 5 feet usual, and seldom more than 6 feet. One man drill, no help either to set or run his drill, loading and blasting, and clearing away waste to make room for next set up.

Total length of holes in 8 hours—limestone stone, 35 to 45 feet—average 39 feet.

One man makes 3 feet per shift, 7 x 4 crosscut section; 2 feet, 8 x 4 uprise.

Two drills sank shaft below 900 feet, 5 ft. per 48 hours—17.1 x 8.2. Machine men working only 12 hours in 48 hours; equal time being required to remove the waste and put in 5 feet set of timber; 5 shovelmen working one shift removing waste.

**The Little Hercules Rock Drill** is a short drill, mounted on tripod column or bar, as desired. Tuckingmill Foundry Co., Camborne, Eng.

| Cylinder. | Weight, lbs. | Length. | Stroke. | Feed. | Price. |
|---|---|---|---|---|---|
| $3\frac{1}{2}$in. | 265 | $41\frac{1}{2}$ | $6\frac{1}{2}$ to 8 | 24 | £65 |
| 3in. | 180 | $37\frac{1}{2}$ | $6\frac{1}{2}$ | 23 | £62/10/– |
| $2\frac{1}{4}$in. | 145 | 34 | — | 18 | £57/10/– |

20 to 80lbs. pressure of air required. Will move at 5lbs.

Cost in coal per drill, 3in., in 24 hours—4 cwt.

The "Little Hercules" is worked by a simple oscillating air valve. When required it will give a short stroke in starting, from 2 to 3 inches.

It is stated that the 3in. "Little Hercules" bored $12\frac{1}{4}$ inches in the hardest granite in one minute, at 80lbs. pressure, at the Drill Competition, Crystal Palace, July, 1905.

The "Little Giant" is said to be *light* and *convenient* to handle, and also *strong*. With an air pressure of about 50lbs., they are said to bore 10 feet per hour with ease, through very hard and close rock, with $1\frac{1}{4}$ in. bits. They cost from £45 to £60 each. The Sydney agent is R. A. Hervey.

**The National Rock Drill,** with $1\frac{1}{8}$ in. bore will sink 5 feet per hour through quartz and trachyte, by 80lbs. pressure compressed air.

The plant, with 4 rock drills and appliances, costs about £350.

The motive power, &c., £250 and upwards. One drill will do 32ft. per day with three men and a boy. Patent blowers are sometimes used for ventilation at about 5lbs. per square inch. For the sake of comparison I may here state that with 1¼ in. hand drills, 2 men will do only 8 ft. per day through quartz or trachyte.

The **Ingersol** and **Eclipse National Rock Drills** cost from £65 to £70 each.

A **compressor** of 667 cubic feet capacity, provides sufficient air to drive 7 of 3½in. drills; 11 of 3 in.; 16 of 2½ in. short rock drills. An air compressor should have 4 per cent. extra capacity for every 1000 feet above sea level.

The National air compressor has double cylinders, about 14 ins. diam. for steam, and 11 ins. diam. for air. This compressor will drive 7 or 8 drills at an average of about 5 tons of wood fuel per drill per week, and cost about £600 complete.

The **Straight Line** simple **Steam and Air Compressor (Sullivan's).**—The air is compressed in two stages, with an intercooler placed between the two air cylinders. The high pressure cylinder, being farthest away from steam cylinder. The advantage claimed by this arrangement is, that larger valves may be used in the high pressure cylinder head, and one stuffing box only exposed to high pressure, instead of two. 60lbs. of steam will produce 80lbs. of air. Price, £600 for 6 drills. They are also made belt driven. Sydney agent: J. Jackson; Melbourne agent: J. E. Elliott.

## EXTRACT FROM "EXCAVATION OF ROCK," BY SULLIVAN'S MACHINERY CO.

**To run a rock drill successfully** start the drill slowly on a short stroke till the hole is about 5 inches deep, then give the machine full head of steam or compressed air, and feed it gradually down—not in spasmodic twists of the feed screw.

When the first steel has cut to its depth remove it—never allow your clearance to become too worn; the following steel, when inserted, should fit the bottom of the hole so as not to jamb.

When a cavity or cross fissure is met with, crank the machine down to a short stroke until the bit or steel has started in the next ledge.

In drilling back holes through damp ground do not run the feed screw the full length. In working the drill back give a good supply of air to prevent the cuttings from packing around the shaft of bit; then knock back quickly till cleared.

In soft ground, where the debris soon clogs the bit, feed slowly and lightly, and quickly tap with drill, using half head of air and a very long stroke to work debris and water into batter.

Experience has shown that the best quality of hose is most suitable, lasting, and least expensive. For steam hose, marline wound, being cooler to handle than metal winding. Half round wire is recommended for air hose, as the flat surface will not cut the rubber, and prevents kinking.

Flexible metallic tubing is specially made for heavy wear.

See prices of above pages 179, 180.

# ROPES, CHAINS.

## BLOCKS, BELTING.

### Ropes and Chains.

The strength of the best Manilla ropes varies as much as rod or bar iron, portions of the same rope will sometimes vary 20 per cent Exposure for two or three months to bad weather when the ropes are alternately wet or dry weakens them rapidly reducing their strength to one half. Tarring ropes also weakens them, the best preservative is to keep them dry and under cover.

### *Rope, Weight and Strength.*

Rule.—For weight in pounds per fathom of three-strand hemp rope, square the girt and multiply result by ·26.

*Breaking strain in cwts.*, square the girt and multiply result by 5·6, Thus, a 3-inch rope would weigh 2 34 lbs. per fathom, and the breaking strain be 50·4 cwts.

Example $3^2 = 3 \times 3 = 9$.

$9 \times \cdot 26 = 2\ 34$, the weight in lbs. per fathom.

then $9 \times 5 \cdot 6 = 50 \cdot 4$, breaking strain in cwts.

### *Best Quality Manilla Ropes.*

| Weight per fathom. | 14oz. | 1¼lb. | 2¼lbs. | 2¾lbs. | 3½lbs. | 4¼lbs. | 5½lbs. | 6½lbs. | 7½lbs. |
|---|---|---|---|---|---|---|---|---|---|
| Girt in inches | 2 | 2½ | 3 | 3½ | 4 | 4½ | 5 | 5½ | 6in. |

### *Best Galvanized Wire Rope.*

| Weight per fathom | 1lb. | 1lb. 8oz. | 3lbs. 8oz. | 5lbs. 8oz | 7lbs. | 12 lbs. |
|---|---|---|---|---|---|---|
| Girt in inches | 1 | 1½ | 2 | 2½ | 3 | 3½ |

WEIGHT AND STRENGTH OF SHORT LINK CHAINS.

| | in. | in. | in. | in. | in. | in. | in. |
|---|---|---|---|---|---|---|---|
| Diam. of iron links | 5-16 | 6-16 | 7-16 | 8-16 | 9-16 | 10-16 | 11-16 |
| Weight per fathom | 5½lbs. | 8lbs. | 11lbs. | 14lbs. | 18lbs. | 23lbs. | 28lbs. |
| Proof strain in cwts. | 25½ | 36¾ | 51¼ | 65½ | 85 | 102 | 127 |
| Diam. of iron links | ¾ | 13-16 | ⅞ | 15-16 | 1 | 1⅛ | 1¼ |
| Weight in lbs. per fathom ... ... | 32 | 38 | 44 | 50 | 56 | 71 | 87 |
| Proof strain in cwts. | 147 | 177 | 200 | 236 | 268 | 334 | 408 |

To find the weight which ordinary short-link chains will bear with safety :—

Multiply the square of the diameter (reckoned in 16ths of an inch) by ·035 ; the product will be the weight in tons Thus, in the case of a ¾-inch chain ¾=12-16ths, and 12 x 12=144 ; then 144 x ·035 =5·04, say 5 tons—the safe working strain. If the squares are divided by 28, a similar result is obtained. Thus, 144 divided by 28=5·14.

*Example.*—½ in. chain (8-16) = 8 x 8 = 64 x ·035 = 2·24 tons which is the safe working strain of a half-inch chain.

## EXTRA FLEXIBLE STEEL WIRE CRANE ROPE.

Bullivants' Brand.

| Size. Circumference. Inches. | Construction. | Weight per Fathom. Lbs. | Guaranteed Breaking Strain. Tons. | Diameter of barrel or sheave. Inches. | Price. Galvanized. per cwt. |
|---|---|---|---|---|---|
| 7 | 6 x 37 | 48½ | 154 | 42 | |
| 6 | ,, | 36½ | 113 | 36 | |
| 5 | ,, | 24½ | 77 | 30 | 56/– |
| 4½ | ,, | 19 | 60 | 27 | |
| 4 | ,, | 15½ | 50 | 24 | |
| 3½ | ,, | 11½ | 38 | 21 | |
| 3½ | 6 x 24 | 10¾ | 35 | 21 | |
| 3¼ | ,, | 9½ | 30 | 18 | 60/– |
| 3 | ,, | 8 | 24 | 16½ | |
| 2¾ | ,, | 6½ | 20 | 15 | 63/– |
| 2½ | ,, | 5½ | 16½ | 13½ | 65/– |
| 2¼ | ,, | 4½ | 13½ | 12 | 67/– |
| 2 | ,, | 3½ | 11 | 10½ | 68/– |
| 1¾ | ,, | 2½ | 8½ | 9 | 75/– |
| 1½ | ,, | 2 | 6¼ | 7½ | 80/– |
| 1¼ | ,, | 1½ | 4 | 5 | 112/– |
| 1 | ,, | 1 | 3 | 4 | 120/– |

(For Agents, *see* advertisement, page 7).

### Hemp and Wire Ropes, Comparative Strength, &c.

| Hemp Rope. | | Wire Rope of Equal Strength. | | | |
|---|---|---|---|---|---|
| Girt in inches. | Lbs weight p. fathom. | Girt in inches. | Lbs weight p. fathom | Breaking strain, tons | Working load, cwt. |
| 2¾ | 2 | 1 | 1 | 2 | 6 |
| 3¾ | 4 | 1⅝ | 2 | 4 | 12 |
| 4½ | 5 | 1⅞ | 3 | 6 | 18 |
| 5½ | 7 | 2⅛ | 4 | 8 | 24 |
| 6 | 9 | 2⅜ | 5 | 10 | 30 |
| 6½ | 10 | 2⅝ | 6 | 12 | 36 |
| 7 | 12 | 2⅞ | 7 | 14 | 42 |
| 7½ | 14 | 3⅛ | 8 | 16 | 48 |
| 8 | 16 | 3⅜ | 9 | 18 | 54 |
| 8½ | 18 | 3½ | 10 | 20 | 60 |
| 9½ | 22 | 3¾ | 12 | 24 | 72 |
| 10 | 26 | 4 | 14 | 28 | 84 |
| 11 | 30 | 4⅜ | 16 | 32 | 96 |

## PATENT GAL. CRUCIBLE STEEL WIRE ROPES.

### Shaw's Brand.

Girth in Inches.

| Strands. | Wires. | 1 | 1½ | 2 | 2½ | 3 | 3½ | 4 |
|---|---|---|---|---|---|---|---|---|
| 6 x | 12.. | 112/– | 66/– | 55/– | 50/– | 48/– | — | — |
| 6 x | 19.. | 112/– | 66/– | 55/– | 50/– | 48/– | — | — |
| 6 x | 24.. | 126/– | 80/– | 65/– | 60/– | 55/– | 55/– | 50/– |

## BLACK PLOUGH STEEL.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6 x 37 | .. | — | — | — | 70/– | — | 65/– | 60/– |

Intermediate sizes in proportion.

## SELF SUSTAINING WIRE ROPE LIFTING BLOCKS.

| 1½ Ton. | 2 Tons. | 5 Tons. |
|---|---|---|
| 8/10/– | 10/10/– | 15/–/– |

For manufacturer, see advt., page 19.

## WIRE ROPE SHEAVE PULLEY BLOCKS.

| Size. | | Tested. | To take Rope. | Price, each. |
|---|---|---|---|---|
| 8 in. | Single, with Eye | 8 tons | 1½ in. cir. | £3 0 0 |
| 10 ,, | ,, ,, | 8 ,, | 2 ,, | 3 15 0 |
| 12 ,, | ,, ,, | 8½ ,, | 2¼ ,, | 4 0 0 |
| 14 ,, | ,, ,, | 12 ,, | 2½ ,, | 6 0 0 |
| 16 ,, | ,, ,, | 16 ,, | 2¾ ,, | 10 10 0 |
| 10 ,, | Double ,, | 14 ,, | 2 ,, | 6 0 0 |
| 12 ,, | ,, ,, | 17 ,, | 2¼ ,, | 7 10 0 |
| 14 ,, | ,, ,, | 20 ,, | 2½ ,, | 9 10 0 |
| 16 ,, | ,, ,, | 38 ,, | 2¾ ,, | 17 10 0 |
| 10 ,, | Treble with Shackle | 18 ,, | 2 ,, | 8 10 0 |
| 12 ,, | ,, ,, | 23 ,, | 2¼ ,, | 10 0 0 |
| 14 ,, | ,, ,, | 35 ,, | 2½ ,, | 14 0 0 |
| 16 ,, | ,, ,, | 50 ,, | 2¾ ,, | 15 0 0 |
| 16 ,, | Fourfold ,, | 55 ,, | 2¾ ,, | 20 0 0 |

See Makers' agents, advt., pages 7 and 19.

### Prices of Hemp Rope.

**Best Manilla Rope.**—By the coil, ½in., 80/– ; ¾in. and up, 75/– per cwt.
Cut, ½in., 9d. ; ¾in., and up, 8d. per lb.

**N.Z. Flax Rope.**—By the coil, ½in., 60/– ; ¾in., and up, 52/– per cwt.
Cut, ½in., 8d. ; ¾in. and up, 6d. per lb.

**Flax Lashing.**—2-ply, in balls, 60/– per cwt. ; 7½d. per lb.
3-ply, in coils, 55/– per cwt. ; 7d. per lb.
Original coils of Rope contain about 120 fathoms; lashing about 56lbs. per coil and 7lbs. per ball.

## IRON BLOCKS. FOR HEMP ROPES.

| Size of Sheaves, Inches | $2\frac{1}{2}$ x $\frac{3}{8}$ | $3\frac{1}{2}$ x $\frac{1}{2}$ | 4 x $\frac{5}{8}$ | $4\frac{3}{4}$ x $\frac{3}{4}$ |
|---|---|---|---|---|
| **Single Sheave Block** .. | 3/6 | 4/– | 5/– | 7/– |
| **Double** ,, .. | 4/6 | 6/6 | 8/– | 10/– |
| **Treble** ,, .. | 6/– | 7/6 | 10/– | 12/– |
| **Snatch** ,, .. | .. | .. | 6/– | 7/– |

| Size of Sheave, Inches .. | 5 x $\frac{7}{8}$ | 6 x 1 | 7 x $1\frac{1}{4}$ | 8 x $1\frac{1}{2}$ |
|---|---|---|---|---|
| **Single Sheave Block** .. | 9/– | 10/– | 12/– | 15/– |
| **Double** ,, .. | 12/– | 14/– | 20/– | 28/– |
| **Treble** ,, .. | 16/– | 19/– | 27/– | 35/– |
| **Snatch** ,, .. | 10/– | 12/– | 14/– | 18/6 |

Extra Wheels or Sheaves for Single, Double, or Treble—

| Blocks—Inches | $2\frac{1}{2}$ | $3\frac{1}{2}$ | 4 | $4\frac{3}{4}$ | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Each | 5d. | 6d. | 7d. | 1/– | 1/6 | 2/– | 3/3 | 4/3 |

## GIN BLOCKS.

| Size of Sheave .. .. | 6 x 1 | 8 x 1 | 10 x 1 | 12 x 1 | 14 x $1\frac{1}{4}$ |
|---|---|---|---|---|---|
| Price .. .. .. | 6/– | 7/– | 9/– | 11/– | 12/– |
| Size of Sheave, Inches .. | 16 x $1\frac{1}{2}$ | | 18 x $1\frac{1}{2}$ | | 20 x $1\frac{1}{2}$ |
| Price, each .. .. | 16/– | | 18/– | | 19/– |

## BURR SAFETY LIFT (Automatic).

12-stone man can lift 1000lbs. dead weight.

A Self-sustaining Pulley.

| | | Weight. | Capacity. | Price. |
|---|---|---|---|---|
| No. 3 .. | For $\frac{3}{8}$-inch Hemp rope | $4\frac{1}{8}$lb. | 300lbs. | 11/– |
| No. 4 .. | ,, $\frac{1}{2}$-inch ,, | $6\frac{1}{2}$lbs. | 350lbs. | 19/– |
| No. 5. .. | ,, $\frac{5}{8}$-inch ,, | 11lbs. | 400lbs. | 24/– |
| No. 6. .. | ,, $\frac{3}{4}$-inch ,, | 17lbs. | 450lbs. | 29/– |
| No. $4\frac{1}{2}$... | ,, $\frac{1}{2}$-inch ,, | 10lbs. | 600lbs. | 34/– |
| No. $5\frac{1}{2}$... | ,, $\frac{5}{8}$-inch ,, | 20lbs. | 700lbs. | 40/– |
| No. $6\frac{1}{2}$... | ,, $\frac{3}{4}$-inch ,, | 28lbs. | 850lbs. | 48/– |

The above prices and weights include Blocks only. No Rope.

**Circular Pit or Building Crane,** to swing complete circle, to raise 2 tons, may be made with a five-ton crab winch, crane post (hardwood 35 ft. by 9in. sq.), Oregon jib, 25 ft. by 9in. by 6in., with iron sheaves or wheels let into crane post and jib, $\frac{1}{2}$in. chain, four $1\frac{1}{2}$in. girt galv. wire rope guides, each 66 ft. long, also 20 fathoms $2\frac{1}{2}$ins. girt best steel flexible wire rope, iron fittings, labour, &c., complete at a cost of about £45.

**Chains for Crab Winches,** price per cwt.—

| | |
|---|---|
| Thickness of iron in link $\frac{1}{4}$-inch diam. .. .. .. | 35/– |
| ,, .. $\frac{5}{8}$ ,, .. .. .. .. .. | 25/– |

## SELF-SUSTAINING DIFFERENTIAL PULLEY BLOCKS.

(*Weston's Patent, with 40 feet Chain*).

| To Lift— | | | |
|---|---|---|---|
| 5 cwt. | 32/6 | Tested Chain, extra per foot.. | 0 6 |
| 10 ,, | 37/– | ,, ,, .. | 0 6 |
| 20 ,, | 52/– | ,, .. .. | 0 9 |
| 30 ,, | 60/– | ,, ,, .. | 0 10 |
| 40 ,, | 75/– | ,, ,, .. | 1 0 |
| 60 ,, | 80/– | ,, ,, .. | 1 1 |

## SELF-SUSTAINING PULLEY BLOCK.

(*Herbert Morris & Bastert, Ltd., Empress Works, Loughborough, Leicestershire.*)

Prices, with Oval-link Chain.

| To lift—Tons .. .. .. | 1 | 3 | 5 | 7½ | 10 | 15 |
|---|---|---|---|---|---|---|
| Price—10ft. hook to hook .. | £5 | £9 | £13 | £18 | £24 | £40 |
| Per ft. extra, hook to hook .. | 1/6 | 2/– | 2/6 | 3/6 | 6/– | — |

## TRAVELLING PULLEY-BLOCKS.

| To lift Tons .. .. .. | 1 | 3 | 5 | 7½ | 10 | 15 |
|---|---|---|---|---|---|---|
| Price—10ft. joist to floor .. | £10 | £15 | £22 | £32 | £39 | £62 |
| Per extra ft. joist to floor .. | 2/– | 2/6 | 3/6 | 5/– | 7/– | 25/– |

## RAW-HIDE BELT LACES—In Boxes, per doz.

| Width, Inches.. | ¼ | ⅜ | ½ | ⅝ | ¾ | 1 |
|---|---|---|---|---|---|---|
| 3 feet long .. | 1/6 | 2/3 | 3/– | 3/9 | 4/6 | 6/– |
| 4 ,, .. | 2/– | 3/– | 4/– | 5/– | 6/– | 8/– |
| 6 ,, .. | 3/– | 4/6 | 6/– | 7/6 | 9/– | 12/– |
| 8 ,, .. | 4/– | 6/– | 8/– | 10/– | 12/– | 16/– |

Machine Stretched Lace Hide, 20/–.

## PUMP (CUP) LEATHERS.

| Outside Diam. In. | 2 | 2¼ | 2¾ | 3 | 3½ | 4 | 4½ | 5 | 5½ | 5¾ |
|---|---|---|---|---|---|---|---|---|---|---|
| | and under | | | | | | | | | |
| Each .. .. | 8d | 9d | 11d | 1/– | 1/2 | 1/6 | 1/10 | 2/3 | 2/7 | 2/9 |
| Outside Dia., Ins. .. | 6 | 8 | 9 | 11 | 13 | 15 | 17 | 20 | 24 | |
| Each .. .. | 3/– | 4/6 | 5/3 | 7/– | 9/3 | 11/9 | 14/6 | 20/– | 27/– | |

## LEATHER DELIVERY HOSE.

| Diameter—In. .. | 1 | 1½ | 2 | 2½ | 3 | 4 | 5 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Per foot .. .. | 1/6 | 2/– | 2/3 | 2/6 | 3/– | 4/– | 5/– | 6/– | 8/– | 9/6 | 11/6 |

For India-Rubber Hose—*See* Index.

## LEATHER BELTING (Single Belt).

| Width—Inches | 1 | 1½ | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ordinary Quality, per foot | –/3½ | –/5½ | –/7 | –/10½ | 1/2 | 1/6 | 1/11 | 2/8 | 3/4 | 4/– |
| Special Quality, per foot | –/4½ | –/6½ | –/8½ | 1/0½ | 1/5 | 1/9½ | 2/3½ | 3/2½ | 4/– | 4/9 |
| Best (Extra Heavy) | –/5¾ | –/7 | /11 | 1/4 | 1/10 | 2/3¾ | 2/11½ | 4/2 | 5/2 | 6/2 |
| **Raw-Hide Belting—** | | | | | | | | | | |
| Single, per foot | –/4 | –/6 | –/8 | 1/– | 1/4 | 1/8 | 2/– | 2/8 | .. | .. |
| Double, per foot | .. | .. | .. | 1/2 | 1/7 | 2/2 | 2/11 | 3/5 | 4/5 | 5/7 | 6/9 |
| 3-ply, per foot | .. | .. | .. | .. | .. | 3/– | 3/9 | 4/6 | 6/– | 7/6 | 9/– |
| **Patent Double-Edged Leather Belting—** | | | | | | | | | | |
| Width—Inches | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| Price, per foot | –/11 | 1/5 | 1/10 | 2/9 | 3/8 | 4/7 | 5/6 | 6/7 | 7/8 | 8/9 |
| **Double Belt—** | | | | | | | | | | |
| Price, per foot | 1/– | 1/6 | 2/– | 3/– | 4/– | 5/– | 6/– | 7/– | 8/– | 9/– |
| **Double Belt—Ordinary.** Twice the Strength of Best Single. | | | | | | | | | | |
| Price, per foot | 1/2 | 1/7 | 2/2 | 3/5 | 4/5 | 5/7 | 6/9 | 7/11 | 9/1 | 10/5 |
| **Double Extra Heavy Belt.**—With Specially-woven Canvas Insertion, breaking strain equal to 3-ply leather. | | | | | | | | | | |
| Price, per foot | 1/3 | 1/9 | 2/4 | 3/8 | 4/9 | 6/– | 7/3 | 8/6 | 9/9 | 11/2 |
| **Three-Ply Belting—** | | | | | | | | | | |
| Price, per foot | .. | .. | .. | 3/– | 4/6 | 6/– | 7/6 | 9/– | 10/6 | 12/– | 13/6 |
| **Balata Belting.**—Subject to a discount of 15 per cent. | | | | | | | | | | |
| Width—Inches | .. | .. | 1 | 1½ | 2 | 3 | 4 | 6 | 8 | 10 | 12 |
| 3-ply, per foot | .. | .. | –/3¼ | –/5½ | –/7 | –/10½ | 1/2 | 1/10 | .. | .. | .. |
| 4-ply ,, | .. | .. | .. | .. | .. | 1/4 | 1/8 | 2/6 | 3/3 | .. | .. |
| 5-ply ,, | .. | .. | .. | .. | .. | .. | .. | 3/– | 4/6 | 6/– | 7/– |
| **India-Rubber Belting—** | | | | | | | | Subject to a dis. of 15 per cent. | | | |
| 2-ply, per foot | .. | .. | –/3 | –/4½ | –/5½ | –/7½ | –/10¼ | 1/3 | 1/8 | 2/1 | 2/6 |
| 3-ply ,, | .. | .. | –/3¾ | –/5¼ | –/7 | –/10 | 1/1¼ | 1/7½ | 2/2 | 2/8½ | 3/3 |
| 4-ply ,, | .. | .. | .. | .. | .. | 1/1 | 1/5¼ | 2/1½ | 2/9¾ | 3/6 | 4/2½ |

Odd Widths also in Stock. See Maker's advt., page 29.

# PUMPS AND HYDRAULIC RAMS.

## THE PRESSURE OF WATER AT DIFFERENT HEADS.

(Per Square Inch.)

| Head of water. Feet. | Lbs. | Head of water. Feet. | Lbs. |
|---|---|---|---|
| 1 | .433 | 10 | 4.33 |
| 2 | .86 | 20 | 8.66 |
| 3 | 1.3 | 30 | 13.00 |
| 4 | 1.73 | 40 | 17.33 |
| 5 | 2.16 | 50 | 21.66 |
| 6 | 2.6 | 60 | 26.00 |
| 7 | 3.03 | 70 | 30.33 |
| 8 | 3.46 | 80 | 34.66 |
| 9 | 3.9 | 90 | 39.00 |

One **cubic foot** of **fresh water** weighs 62.5 lbs., and contains 6.232 gallons.

One **cubic foot** of **sea water** weighs 64.25 lbs.

One **cylindrical foot** weighs 49.08 lbs., and contains 4.894 gallons.

## PUMPS.

### EDISON'S DIAPHRAGM BILGE PUMPS.

**Hand Power Suction Pumps.**

For Water containing Sand and Mud.

| | | |
|---|---|---|
| $2\frac{1}{2}$″ Suction Pipe, capacity | 1800 gals. per hour | 90/- |
| 3″ ,, | 4000 ,, | 105/- |
| 4″ ,, | 6000 ,, | 160/- |

### SEMI-ROTARY OR WING PUMPS.

Lever hand power. Will draw water 25 feet and force to 150 feet vertical.

| | | | |
|---|---|---|---|
| No. 0—$0\frac{1}{2}$ | inch pipe | 240 Gallons per hour | £1 2 0 |
| No. 1—$0\frac{3}{4}$ | ,, | 300 ,, ,, | 1 5 3 |
| No. 2—1 | ,, | 360 ,, ,, | 1 7 6 |
| No. 3—$1\frac{1}{4}$ | ,, | 540 ,, ,, | 1 12 6 |
| No. 4—$1\frac{1}{4}$ | ,, | 750 ,, ,, | 2 2 6 |
| No. 5—$1\frac{1}{2}$ | ,, | 1140 ,, ,, | 2 10 0 |
| No. 6—$1\frac{1}{2}$ | ,, | 1300 ,, ,, | 2 15 0 |
| No. 8—2 | ,, | 1600 ,, ,, | 4 0 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Household Iron Pumps, from | | | | | | 15/- |
| Ditto, Brass do. | | | | | | 40/- |
| **Douglas Lift Pumps**—Nos. | 2 | 3 | 4 | 5 | 6 | |
| | 10/6 | 11/6 | 12/6 | 16/- | 18/- | |
| Size of pipe required | $1\frac{1}{4}$ | | $1\frac{1}{2}$ | | 2″ dia. | |

Douglas Force and Lift Pumps. No. 3, 42/- : No. 4, 45/- : No. 6, 57/6

**Hydraulic Ram.**—No. 4 size requiring a water supply of from 3 to 7 gallons per minute, with discharge pipe, ¾in. bore, will cost about £3. with pipes added.

This is the most simple and effective machine for forcing a continuous stream of water by gravitation to a considerable altitude, saving the power required in using a force pump. It will work with even 18 inches fall of water and does not easily get out of order.

For ordinary purposes in conveying water about 300 yards, about one-seventh of the water can be raised and discharged at an elevation five times as high as the fall, or one-fourteenth part high as ten times as the fall applied. Thus with a fall of five feet of every 7 gallons drawn from the fountain, one gallon may be raised 25 feet, or half a gallon 50 feet. The distance from the fountain to the ram should be from 25 to 50 feet, and all sharp bends should be avoided in the piping.

**Danks' Hydraulic Rams,** No. 2, 35/–; No. 3, 40/–; No. 4, 50/–; No. 5, 78/–; No. 6, 140/–.

**Automatic Hydraulic Rifle Ram,** New York, to work from 2 to 3 ft. head of water upwards—

| | | | | | | |
|---|---|---|---|---|---|---|
| 1¼″ drive pipe | 2½ to 5 gals. per minute, through | ¾″ del. pipe | .. | £16 |
| 2″ ,, | 7 ,, 16 ,, | 1in. ,, | .. | £35 |
| 4″ ,, | 30 ,, 75 ,, | 2″ ,, | .. | £75 |
| 12″ ,, | 375 ,, 750 ,, | 5 ,, | .. | £130 |

## WINDMILLS AND PUMPS.

### Ball-bearing, Back-geared, self-regulating.

30in. Angle Steel Derrick, without mill, £10/15/–; £11. Fixing same, 30/– to £3/–/–.

| Size of Mill. .. | 6ft. | 8ft. | 10ft. | 12ft. | 14ft. | 16ft. |
|---|---|---|---|---|---|---|
| Geared Mill with 30ft. Steel Tower .. | £15 | £18 | £25 | £32 | £45 | £59 |
| Geared Mill with Steel Tower to bolt to Wooden Tower .. | £9 | £12 | £16 | £22/10/ | £34 | £48 |

**Labour.**—Raising and fixing, cost, from £1 to £2.

## LIST OF WINDMILL PUMPS.

| Inches .. .. | 2½ | 3 | 3½ | 4 | 4½ |
|---|---|---|---|---|---|
| Fig. 014, all Brass .. | 35/– | 40/– | 50/– | 75/– | |
| ,, 041 ,, .. .. | £6/18/6 | £9/3/– | £10/4/– | £18 | |
| ,, 057 ,, .. | 40/– | 45/– | 80/– | 95/– | .. |
| ,, 057a ,, .. | 47/6 | 52/6 | 85/– | 100/– | £8/5/– |
| ,, 514½, Brass Lined .. | 95/– | 100/– | £6/5/– | £7/5/– | £8/12/6 |

## "STEEL-WINGS" WINDMILLS.

These machines are constructed with the wings enclosed inside steel framework, or ladder, which is pivoted top and bottom, and stayed by steel wire rope guides to the ground.

| Wings. | Standard Ladder Towers. | Wings. | Standard Ladder Towers. |
|---|---|---|---|
| 7′6″..10/10/– | 30ft., 5/– foot | 15′ 30/–/– | 35ft. 6/– foot |
| 10′ ..15/–/– | 30ft. 5/– foot | 17′6″ 42/15/– | 40ft., 7/– foot |
| 12′6″..25/–/– | 35ft. 6/– foot | 20′ 50/–/– | 40ft., 7/6 foot |

Size above this, £3/10/– a foot of dia. of wheel. Tower, 15/– a foot, or special quotation. Intermediate Gear extra, from £3, if required for reducing or accelerating speed of pump.

Suitable for small dairy farms, suburban residences, hotels, irrigation electric lighting, freezing, cooling purposes, and wells up to 250 feet.

**Flood's Patent Improved Waterlift,** obtained numerous prize certificates from Intercolonial Exhibitions :—

7in. waterlift, with frame and pulleys, &c., and horse-works to lift 17 ft. .. .. .. .. .. .. .. £90

5in. ditto, with horse-works, &c. .. .. .. .. .. £75

**Water raised per hour,** by one man—

| | | |
|---|---|---|
| 2,700 | gallons, well | 10 feet deep. |
| 1,550 | ,, | 20 ,, |
| 900 | ,, | 30 ,, |
| 675 | ,, | 40 ,, |
| 540 | ,, | 50 ,, |

One horse will raise per hour—

| | | |
|---|---|---|
| 14,400 | ,, | 12 ,, |
| 6,900 | ,, | 25 ,, |
| 3,423 | ,, | 50 ,, |

## FLOOD'S PATENT WATER LIFTS.

*In the Australian Cities.*

| Bore of Tube. | Power Required. | Weight Lifted. | Gallons per hour. | Price complete. | Every extra ft. |
|---|---|---|---|---|---|
| 1¾in. | 1 man | 35 feet | 840 | £16 | 10/– |
| 2½ .. | 1 ,, | 10 ,, | 3,000 | £16 | 10/– |
| 3½ .. | 2 men | 10 ,, | 6,000 | £24 | 15/– |
| 5 ,, | 1 horse | 10 ,, | 18,000 | £36 | 20/– |
| 7 ,, | 2 horses | 10 ,, | 36,000 | £48 | 30/– |
| 10 ,, | 4 ,, | 10 ,, | 72,000 | £81 | 60/– |

Agents—296 Sussex-street, Sydney.

## THE PULSOMETER STEAM PUMP.

A simple, and cheap apparatus for raising water and other liquids by direct power or pressure of steam. A good feature of the Pulsometer is the simplicity with which the few wearing parts can be immediately replaced.

It will work on a constant suction without attendance, or as long as the steam and water are supplied to it. It requires no lubricant, oil, tallow, or packing, and needs no skilled attendance.

The Pulsometer will also raise water mixed with mud, sand, &c.

### Sizes and Capacities.

| No. | Steam Supply Pipe.—Size. | Suction Pipe Size. | Delivery Pipe. Size. | Gallons per hour. |
|---|---|---|---|---|
| 1 | ¼in. | 1½in. | 1in. | 600 |
| 2 | ½in. | 2in. | 1½in. | 1000 |
| 3 | ½in. | 3in. | 2in. | 2500 |
| 4 | ⅝in. | 4in. | 2½in. | 4000 |
| 5 | ¾in. | 4½in. | 3in. | 6000 |

Above quantities are approximate only.

The number of gallons represent the discharge on a total lift of fifteen feet.

## CENTRIFUGAL PUMPS.

These pumps, like the Californian pump and water lifts will raise water mixed with sand or clay without injury to the pump.

They are made to work in a horizontal or vertical shaft with a pulley and endless band.

Suction pipes, with elbow and foot valve, also extra shafting, can be had with pumps.

### Speed and Power List for Centrifugal Pumps.

| Size of Pump. | Size of Driving Pulley. | Water raised per minute. Approx. gals. | Lift and Force in Feet. H.P. | R.P.M. | H.P. | R.P.M. | H.P. | R.P.M. |
|---|---|---|---|---|---|---|---|---|
| 2in. | 4″ x 3″ | 50 to 75 | 2 | 1538 | 2 | 1796 | 2 | 2232 |
| 3in. | 4″ x 4″ | 100 ,, 150 | 2 | 1366 | 3 | 1708 | 4 | 1984 |
| 4in. | 5″ x 5″ | 200 ,, 300 | 3 | 1230 | 6 | 1537 | 8 | 1785 |
| 6in. | 8″ x 6″ | 500 ,, 750 | 7 | 1025 | 10 | 1281 | 16 | 1488 |
| 8in. | 10″ x 9″ | 1050 ,, 1575 | 11 | 769 | 18 | 898 | 26 | 1116 |
| 10in. | 16″ x 10″ | 1500 ,, 2150 | 15 | 615 | 25 | 768 | 35 | 872 |

Prices of above Pumps :—2in., £14; 3in., £16; 4in., £17/10/–; 6in., £28.

Connected in direct line to output.

Price includes foot valves at bottom of pipe. See Index, Advt.

# PLANT AND TOOLS.

## MACHINERY AND APPLIANCES.

Present list of prices attached for portion of contractor's plant and tools not referred to previously throughout this work. For the convenience of contractors, and not for the purpose of advertising firms.

**Adzes,** Fencers', 4/6 ; 6in. Railroad, 6/3.

**Axes.**—Squaring, 12in. blade, 9/– ; Collins' and Kelly's, 5lb. handled 4/– ; Mortice Axes, double end, 10d. per lb.

**Hatchets.**—Lath and Shingling, 1/9 ; Claw, 2/3 ; Carpenter's bench, 4in., 2/2 ; 6in., 4/–.

**Asphalt Cauldron,** 20 gallons, on wheels, £15.

**Barrows.**—Navvy, wood, with wrought iron wheel, 15/– to 16/– each. American garden, movable sides, 17/6 to 20/– ; Galv. Iron, 23/6 ; All steel, 40/– ; Pan-American, with steel trays, 25/– ; Heavy wood, 25/– ; **Samson** truck, 25/–.

**Brick Carts.**—£12 to £20 ; cart harness, £5/10/– ; 4-wheel tray waggon, £25 to £40.

**Builder's Hand Carts.**—£5 ; Spring cart, £10 to £15.

**Buckets.**—Galv., 3 gal., 18/– per doz. ; 4-gal. (strong), 40/–.
Round Well galv. bucket, with valve in bottom, 40 gals., 84/– ; 25 gals., 75/–.
Patent Fire buckets, 45/– per dozen.

**Boring Machine.**—Phillips' Angular, 25/– each ; set of 7 bits, extra, 20/–

## BLACKSMITH'S PLANT.

**Anvils,** 40/– per cwt. Forge tools. per lb., 8d.

**Bellows.**—(Alldays & Onions'), 18in., 35/– ; 24in., 60/– ; 30in., 95/– ; 36in., £8/5/– ; 42in., £15/15/–.

**Colonial Make,** 18in., 21/– ; 30in., 60/– ; 42in., £10.

**Tue irons,** 3/– to 4/– each ; Water tue iron, 8/– to 11/– each.

**Forges.**—Portable round bellows, 18in., 80/– ; 24in., 120/– ;
Portable, with fan blast, 18in., 70/6.
Champion's Steel ball-bearing, 10in. blower, £9/8/–
American, 40 x 28 hearth, with fan blast, £8.

**Vyces.**—Leg vyces, to 25lbs., 6d. per lb.
Peter Wright's, 4½in. jaw, 60/–.

**Tongs.**—3lb. each, 8d. to 10d. per lb.

**Swage Blocks.**—All sizes, 21/– per cwt. 16″ x 16″ = 2 cwt., 42/–.
Swages, 2/– each ; cutters, 3/– ; flatteners, 2½in. square, 4/–.
Handled punches, ⅜″ to ¾″ = 2/6 each.

**Chains.**—Best short link, per cwt., $\frac{3}{8}$in., 40/– ; $\frac{1}{2}$in., 32/– ; $\frac{5}{8}$in., 28/– ; $\frac{3}{4}$in., 25/–.

## CRAB WINCHES.

With Brakes.

| | Single Purchase. | Double Purchase. |
|---|---|---|
| To lift direct 16 cwt. | £5 0 0 | £6 0 0 |
| 20 ,, | 5 15 0 | 7 10 0 |
| 25 ,, | 7 10 0 | 8 0 0 |
| 30 ,, | 8 10 0 | 9 10 0 |

50 cwt., £12/10/– ; 60 cwt., £18 ; 80 cwt., £25.

## CRANES.

Jib Crane.

| | | | |
|---|---|---|---|
| Hand power, with separate drums .. | 2 tons | 50ft. jib. | £62 |
| Braced mast .. .. .. | 5 ,, | 65 ,, | £95 |
| Steam, braced mast and jib .. .. | 5 ,, | 70 ,, | £420 |
| Electric .. .. .. .. | 5 ,, | 70 ,, | £456 |

**Cranes.**—Warehouse wall cranes, with chain, 150 ft., and crab winch, 4 ft. swing "gallows," on brackets top and bottom, 10 cwt., £15/10/

**Cramps.**—Joiners, 4ft., 14/– ; 6ft., 16/–.
Sash, 30in., 11/6 ; 36in., 12/–6
Floor, 17/6 each.
Floor-dogs (Kimberley's), 16/– per pair.
Floor (Woodhead's), 35/– each.
Ceiling (Woodhead's), 4 to 8 lbs., 25/– to 30/– each.

**Clamps.**—Iron saw clamps, 3/– to 5/– each.

**Crowbars.**—Steeled diamond point and heel, 3½d. per lb. Approximate weight, 4′6″ x $1\frac{1}{8}$ = 15lbs. ; 6ft. x $1\frac{1}{2}$″ = 35lbs.

**Chisels.**—Cold, 7d. to 1/6 each.
Mortise chisels, 1in., 1/6 according to size.

## COUNTER SHAFTS AND DRIVING PULLEYS OVERHEAD.

| Dia. Driving Pulley Inches. | Pulley Main Belt Inches. | Dia. of Shaft. | Price with one Driving Pulley. |
|---|---|---|---|
| 12 | 4 | $\frac{7}{8}$ | 40/– |
| 14 | 5 | 1 | 50/– |
| 16 | 6 | $1\frac{1}{8}$ | 60/– |
| 18 | 7 | $1\frac{1}{4}$ | 70/– |
| 21 | 8 | $1\frac{3}{8}$ | 90/– |
| 26 | 9 | $1\frac{5}{8}$ | 120/– |
| 30 | 10 | $1\frac{7}{4}$ | 150/– |
| 32 | 12 | 2 | 200/– |
| 36 | 14 | $2\frac{1}{4}$ | 250/– |
| 40 | 16 | $2\frac{1}{2}$ | 325/– |
| 44 | 18 | 3 | 425/– |

**Drilling Machines,** Engineer's hand bench, from £3/10/–
Blacksmith's Post Drill, New Champion, from £3/10/–
**Joiners' Mortise Machine,** foot power, £6/10/–.
**Aland's Patent Air Propellers or Exhaust Fans**—

| 12 | 24 | 36 | 48 dia. |
|---|---|---|---|
| 5/–/– | 8/10/– | 16/–/– | 23/10/– each. |

Manufacturers, Shaw & Co., advertisement page 19.

## ENGINEERS' AND PLUMBERS' TOOLS.

**Bolt Cutters** (Boker's)—for small rods, 4/6 ; ⅜in. dia., 11/6 ; ½in., 16/– ; ⅝in., 21/–.

**Pipe Vyces**—To take pipe, ¼ to 1 in., 9/6 ; ¼ to 2in., 12/– ; ¼ to 3in., 17/6 each.

**Footprint Pipe Vyces,** for ⅛ to ¾in., pipe, 2/9 each.

**Wrenches.**—Heavy, double pillar, " Railway "—

| Length .. .. | 8 | 10 | 12 | 14 | 16 |
|---|---|---|---|---|---|
| | 5/– | 5/6 | 6/– | 7/9 | 11/6 |

**Footprint Wrenches**—

| Jaws open from, ins. .. | 1/16 to 1½ | ⅛ to 2½ | ¼ to 3 | ½ to 3¾ |
|---|---|---|---|---|
| Length, ins. .. .. | 5¾ | 9 | 12, 14 | 16 |
| | 11d. | 2/– | 3/–, 3/6 | 6/– |

**Chain Pipe Wrenches**—

| Will take pipe .. | ⅛ to 1½in. | ⅛ to 1¼in. | ¼ to 2½in. | ¾ to 4in. |
|---|---|---|---|---|
| | 6/6 | 9/– | 13/– | 18/– |

Adjustable S Wrench, 8in., 2/6 to 14in., 5/6
Cyburn Spanner, ⅝in., 3/3 ; to 2¼in., 16/–.
Malleable double end Spanners, for Hexagon Nuts, from 1/–.

**Cutters.**—" Daniel's," 3-wheel pipe, to cut up to 1in. dia., 14/– ; to 2in., 22/6 ; to 3½in. dia., 30/– each.

**Tongs.**—Ordinary Pipe Tongs—

| To take pipe, ins. | ½ | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 |
|---|---|---|---|---|---|---|---|---|
| Each | 1/9 | 2/3 | 2/6 | 3/– | 3/6 | 5/– | 6/6 | 7/6 |

**Snips.**—Straight, Matheson's, 3/6; bent, 4/–. **Soldering Irons,** ½-lb. to 3lbs., 2/– per lb. **Rivet Sets,** 2/3 ; **Screw-driver,** 8d. to 2/– ; **Plumber's Dresser,** 2/6. **Bossing Mallet,** 1/3. **Bossing Stick,** 1/10.

## PLUMBER'S LEAD MELTING POTS.

| Capacity—Gallons .. | ¼ | ½ | 1 | 1¼ | 1½ | 2 | 2½ |
|---|---|---|---|---|---|---|---|
| Each .. .. | 1/4 | 1/9 | 3/– | 3/6 | 4/6 | 5/– | 6/– |

## STOCKS AND DIES.

**Solid " Walworth,"** without taps, for gas threads, cuts ¼, ⅜, ½, ¾, and 1 inch, 16/– ; ⅞, 1, 1¼, and 1½ inch, 20/– ; 1¼, 1½, and 2 inch, 22/–. Set of 8 taps, ¼ to 2 inch, 34/– extra.

Stocks and Dies, Engineers', Whitworth thread, for bolts and nuts—
Daniel's English, 24/– to 55/– per set, with plug and taper tap.
Green River Screw Plate, 35/– to 72/–.

## ENGINES.

Prices as under, obtained at the Sydney Agricultural Show, 1907, for convenience of Contractors, and not for advertising the firms.

**Traction Engines,** " Foster." Single cylinder, 6 x 9 — 4 h.p., £600
Compound, 4 h.p., £650 ; 8 h.p. £700.
To draw 30 tons on a level road, £1000.

**Traction Engine,** McLaren's, from £600.

## STATIONARY AND PORTABLE GAS AND OIL ENGINES.

**Engines for Hoisting, Pumping and Electrical**—
Gas or Kerosene Oil Engine, " Melvin's Otto," from ¾ h.p. upwards· 4 h.p., £85 ; 7½ h.p., £180.

**Gas** consumption, 16 to 20 feet per h.p. per hour.

**Oil** consumption, ⅝ to 1 pint per h.p. per hour.
J. Carson, Manufacturer, Rookwood.

**The Hercules Oil Engine**—Price from Buzacott & Co., Ltd.

**Benzine Gas Power, " Olds "**—
2 to 3 h.p., £40 ; 4 to 6 h.p., £65 ; 5 to 7 h.p., £80. Consumption, 2 gals. Benzine, at 1/3 per gal., for 3 h.p. engine, for 8 hours running. Cost of oil, 2/6.

Gasoline Engine, " White," stationary or portable, all sizes up to 4 h.p. £180. Agents—Gibson, Battle & Co.

Blackstone Oil Engine, portable. No electric battery. W. & A. McArthur & Co.

**Fencing Spuds,** each 8/–.

**Grindstones,** imported, per inch dia.—24in., 3d. ; 30in., 4d. ; 56in., 6d. ; 60in., 1/6.

**Hammers.**—Carpenters' Claw, 2/– to 3/9.
Slater's, 3/9 ; Bricklayers', 2/6.
Sledge, S. & D. face, 7lbs. and up, 5½d. per lb.
Drill Hammers, per lb., 6d.
Quarry Mauls, per lb. 6d.
Napping, 1¼lb., 1/5 ; 2lbs., 2/–.
Engineer's ball peins, without handles, ¼lb., 6d. ; 1lb. 8d.

## HORSE GEARS.

Bentall's make, Pyrmont.

**Two-horse** gear, 42in. driving wheel, reversible clutch, separate intermediate, with renewable cast bearings, weight, 12½ cwt., £22/15/–

**One-horse,** 36in. driving wheel, ditto, weight 10 cwt., £19/15/–
Ditto, light gear, weight 5½ cwt., £13.
Samson Horse Gear, similar, from £12.

## JACKS.

All sizes.

**Hydraulic** Jack, Tangye's, ship pattern, 50 tons, each .. £19 0 0
Lift from foot pedestal, ship pattern, 50 tons, each .. 17 16 0

**Timber** Jack, Boker's Patent—To lift 1½ tons, 25/–; 2½ tons 1 10 0
3 tons, 40/–; 4 tons, 45/–; 5 tons .. .. .. 3 10 0

**Wallaby** Jack, Trewhella Bros.' Patent lever, for general lifting, posts, boulders, rolling logs, etc.—
Single purchase to lift 2½ tons, weight 49lbs. .. .. 2 0 0
Double ,, 4 ,, weight 56lbs. .. .. 3 5 0
Special ,, 6 ,, weight 70lbs. .. .. 3 15 0

**Monkey** Jack, Trewhella Bros.' Patent, with extra long spear arm for tree grubbing. Made of steel throughout; duplicate parts, fitted with patent automatic lowering gear—
Jack and handle, weight 86lbs., 90/–; guide, weight 2lbs., 2/6; long spear, weight 42lbs., 10/–; short spear, weight 26lbs., 7/6.

Screw Lifting Jacks, wrought iron, **bottle**, and brass nut—

| Tested to tons .. | 1 | 2 | 4 | 6 | 8 | 10 | 20 |
|---|---|---|---|---|---|---|---|
| Price .. .. | 8/– | 12/– | 20/– | 27/– | 35/– | 50/– | £5 |

Leg traversing Jack, wrought iron and malleable cast iron base, to lift 20 inches, top and bottom ratchets—
5 tons, to traverse 7 inches .. .. .. .. 3 1 0
10 tons, to traverse 10 inches .. .. .. .. 4 0 0
15 tons, to traverse 12 inches .. .. .. .. 4 15 0
20 tons, to traverse 18 inches .. .. .. .. 8 4 0

## LADDERS.

**Adjustable Slide** ladders, from 2/6 to 5/– per foot.

**Heavy,** bricklayers', Oregon sides, H.W. rungs, bolted, 1/6 per foot.

**Medium,** plasterers and carpenters', ditto, bolted, 1/– per rung.

**Painters'** and stock ladders, Oregon sides, H.W. rungs, riveted—
10 ft., 11/–; 15 ft., 16/–; 20 ft., 22/–; 30 ft., 33/–; 40 ft., 44/–; 50 ft., 50/–.

**Step Ladders,** light, with hinged stays and cords—
5ft. long, 8/–; 6ft., 10/–; 8ft., 13/–; 10 ft., 17/6.

## LEVELS.

Mason's, 3/–. Carpenter's, 5/–.
Dumpy, with tripod stand, from £7 to £15.
Levelling Staff, plain, from 30/–.
Telescopic Staff, from £6/10/–.

## BALLAST ROLLER.

**Can be loaded with Water or Sand.**

| Width and Diameter. | Weight Empty. Cwt. | qrs. | lbs. | Weight Full. Cwt. | qrs. | lbs. | Price. £ | s. | d. |
|---|---|---|---|---|---|---|---|---|---|
| 18 x 18 inches | 2 | 2 | 0 | 3 | 3 | 0 | 4 | 10 | 0 |
| 21 x 21 ,, | 3 | 1 | 0 | 5 | 1 | 0 | 6 | 0 | 0 |
| 24 x 24 ,, | 4 | 1 | 0 | 7 | 0 | 0 | 7 | 5 | 0 |
| 27 x 27 ,, | 6 | 2 | 0 | 10 | 0 | 0 | 9 | 5 | 0 |
| 30 x 30 ,, | 8 | 2 | 0 | 13 | 2 | 0 | 14 | 10 | 0 |
| 30 x 30* ,, | 9 | 0 | 0 | 14 | 0 | 0 | 16 | 10 | 0 |

*With both shafts for pony and handle for manual power.

## SAWS.

Cross-cut, 4½ ft., 6/6 ; 6½ ft., 9/9.
Lightning Tooth, 3 ft., 5/– ; 5 ft., 8/–
Hack Saws, for cutting metal, 4/–.
Best Hand, Carpenter's, from 4/–. Rip Saws, 6/–.
Circular, Disston's, 24 inch diameter, 30/– ; 36in., 65/–.

## CONTRACTORS' AND BUILDERS' SCREENS.

In Wood Frame, very strong. Any size made to order.

| Mesh—Inches .. | ⅛ | 3/16 | ¼ | ⅜ | ½ | ¾ | 1 |
|---|---|---|---|---|---|---|---|
| Each .. .. .. | 30/– | 28/– | 27/– | 26/– | 25/– | 24/– | 20/– |

## STEEL.

**Steel** Quarry Wedges, 33/– per cwt., or 4d. per lb.
,, Wood Wedges, same price as above.
,, Octagon Mining, or drill steel—⅜in., 32/– per cwt. ; ½in. to 1½in., 30/– per cwt., or 4d. per lb.
,, Square and Round Cast Tool Steel, ½in., and up, 55/– per cwt., or 7d. per lb.
,, Spring, Blister Steel, for boring tools, 25/– per cwt., or 3½d. per lb.
,, Picks, 3/9 each.

## WHEELS.

**Wrought Barrow,** with fixed Spindles and Gudgeons—
14in., 4/9 ; 16in., 5/3 ; 18in., 5/9 each.
**Cast Iron Navvy Barrow Wheels,** without fittings—
16 x 1¾ in., 3/3 ; 17 x ¾ in., 3/– each.
**Cast Iron Truck Wheels** (Plain Rim) light—

| Inches .. | 6 | 7 | 8 | 9 | 10 | 12 | 14 | 16 | 18 |
|---|---|---|---|---|---|---|---|---|---|
| Per pair | 1/3 | 1/6 | 1/9 | 2/3 | 3/– | 4/6 | 5/6 | 7/– | 9/– |

**Cast Iron Truck Wheels**—Heavy—All sizes, at 21/– per cwt., or 3d. per lb.

## CAST IRON FLANGED TRUCK WHEELS.

| Inches .. .. .. | 6 | 8 | 10 | 12 |
|---|---|---|---|---|
| Each .. .. .. | 2/6 | 3/6 | 4/6 | 5/6 |

**Pedestals** for Flanged Truck Wheels, to take 1¼-in. axles, 4/6 per set.

TABLE showing the results of experiments on the properties of New South Wales and other timber :—

| TIMBER. | Specific gravity or ounces per cube foot. | Elasticity or stiffness, Red Pine being 1.00. | Breaking weight in lbs. per square in., 12 in. bearing. | Ditto, or strength, Red Pine being 1.00. |
|---|---|---|---|---|
| Box, mean of 4 experiments ... | 1,230 | 1.17 | 2,445 | 1.82 |
| Iron bark, do. ... | 1,211 | 0.91 | 2,288 | 1.70 |
| Spotted gum, do... | 1,035 | 1.06 | 2,006 | 1.49 |
| Stringy bark, do... | 937 | 0.75 | 1,818 | 1.36 |
| Teak ... ... | 745 | 1.31 | 2,462 | 1.84 |
| Ash ... ... | 760 | 0.89 | 2,026 | 1.50 |
| Canadian oak ... | 872 | 1.16 | 1,766 | 1.32 |
| English oak ... | 934 | 0.79 | 1,672 | 1.25 |
| Pitch pine ... | 660 | 0.61 | 1.632 | 1.22 |
| Beech .. ... | 852 | 0.74 | 1,556 | 1.16 |
| Red pine ... ... | 657 | 1.00 | 1,341 | 1.00 |
| Riga fir ... ... | 753 | 0.72 | 1,108 | 0.83 |
| Elm ... ... | 553 | 0.38 | 1.013 | 0.75 |

The first series of experiments were made at the Sydney Mint by the Commissioner of Railways in August, 1858.

The second series of experiments are taken from "Barlow on the Strength of Timber and Iron," and show the mean of three experiments on each description of timber, the samples being selected from Woolwich Dockyards.

The following Table is calculated from formulæ given by Barlow, viz. $W = \frac{4 A D^2 S}{L}$ in which W represents the breaking weight in lbs. of a piece of timber, A being its breadth, D its depth, L its length or bearing, and S the tabular strength of each square inch in sectional area: the value of S for different kinds of timber is given in the above table, where we find red pine to be 1,341. The result of the above formulæ may also be stated in cwts., thus $W = \frac{4 A D^2 1,341}{12 \times 112} = 4 A D^2$ and lastly $\frac{W}{4} A D^2$ the result given in the following table, from which may be ascertained the strength of any scantling, of timber, by multiplying the result, given in the following table, by the proportions stated in the fourth column of the above table, which I have cast out for this purpose.

EXAMPLE.—One-fourth of the breaking weight of a piece of red pine 14 inches deep by 12 inches in width, with a clear bearing of 20 feet, is shown by the following table to be 117.6 cwt. (see example at the end of table) this multiplied by 1.82 will be 214. cwt., equal to one-fourth of the breaking weight of box, the weight being applied in the centre of a beam or $\frac{1}{8}$ of the breaking weight if distributed equally over the beam, as in a girder for a floor, shop window, &c.

The weights in this Table are—$\frac{1}{8}$th of the breaking weight of different scantlings, having 1 foot bearing, uniformly loaded; or $\frac{1}{4}$th of the same when suspended in the middle.

RULE.—To ascertain the strength of a piece of timber: Divide the third or cwt. column by the length or bearing of the timber, and the weight in cwts. will be obtained.

| Depth. | | Breadth. | | Cwt. |
|---|---|---|---|---|
| 1½ | by | 1 | ... | 2·2 |
| | | 1½ | ... | 3·4 |
| | | 2 | ... | 4·5 |
| | | 3 | ... | 6 7 |
| | | 4 | ... | 9·0 |
| | | 5 | ... | 11·2 |
| | | 6 | ... | 13 5 |
| | | 7 | ... | 15·7 |
| | | 8 | ... | 18 0 |
| | | 9 | ... | 20·2 |
| | | 10 | ... | 22·5 |
| | | 11 | ... | 24·7 |
| | | 12 | ... | 27·0 |
| 2 | by | 1½ | ... | 6·0 |
| | | 2 | ... | 8·0 |
| | | 3 | ... | 12 0 |
| | | 4 | ... | 16·0 |
| | | 5 | ... | 20 0 |
| | | 6 | ... | 24·0 |
| | | 7 | ... | 28·0 |
| | | 8 | ... | 32 0 |
| | | 9 | ... | 36 0 |
| | | 10 | ... | 40·0 |
| | | 11 | ... | 44·0 |
| | | 12 | ... | 48·0 |
| 3 | by | 2 | ... | 18 0 |
| | | 2½ | ... | 22 5 |
| | | 3 | ... | 27 0 |
| | | 4 | ... | 36 0 |
| | | 5 | ... | 45 0 |
| | | 6 | ... | 54·0 |
| | | 7 | ... | 63·0 |
| | | 8 | ... | 72·0 |
| | | 9 | ... | 81·0 |
| | | 10 | ... | 90 0 |
| | | 11 | ... | 99 0 |
| | | 12 | ... | 108·0 |
| 4 | by | 2 | ... | 32·0 |
| | | 2½ | ... | 40 0 |
| | | 3 | ... | 48 0 |
| | | 3½ | .. | 56·0 |
| 4 | by | 4 | ... | 64·0 |
| | | 5 | ... | 80·0 |
| | | 6 | ... | 96·0 |
| | | 7 | ... | 112·0 |
| | | 8 | ... | 128 0 |
| | | 9 | .. | 144·0 |
| | | 10 | ... | 160·0 |
| | | 11 | ... | 176·0 |
| | | 12 | ... | 192·0 |
| 5 | by | 2 | ... | 50·0 |
| | | 2½ | ... | 62·5 |
| | | 3 | ... | 75·0 |
| | | 3½ | ... | 87 5 |
| | | 4 | ... | 100·0 |
| | | 5 | ... | 125·0 |
| | | 6 | ... | 150·0 |
| | | 7 | ... | 175 0 |
| | | 8 | ... | 200 0 |
| | | 9 | ... | 225·0 |
| | | 10 | ... | 250·0 |
| | | 11 | ... | 275·0 |
| | | 12 | ... | 300 0 |
| | | 13 | ... | 325 0 |
| | | 14 | ... | 350·0 |
| | | 15 | ... | 375·0 |
| 6 | by | 2 | ... | 72·0 |
| | | 2½ | ... | 90·0 |
| | | 3 | ... | 108·0 |
| | | 3½ | ... | 126·0 |
| | | 4 | ... | 144·0 |
| | | 5 | ... | 180·0 |
| | | 6 | ... | 216·0 |
| | | 7 | ... | 252 0 |
| | | 8 | ... | 288 0 |
| | | 9 | ... | 324·0 |
| | | 10 | ... | 360·0 |
| | | 11 | ... | 396 0 |
| | | 12 | ... | 432·0 |
| | | 13 | ... | 468·0 |
| | | 14 | ... | 504·0 |
| | | 15 | ... | 540 0 |
| 7 | by | 2 | ... | 98·0 |
| | | 2½ | ... | 122·5 |
| | | 3 | ... | 147·0 |
| | | 3½ | ... | 171·5 |
| | | 4 | ... | 196·0 |
| | | 5 | ... | 245 0 |
| | | 6 | ... | 294 0 |
| | | 7 | ... | 343·0 |
| | | 8 | ... | 392 0 |
| | | 9 | ... | 441·0 |
| | | 10 | ... | 490 0 |
| | | 11 | ... | 539·0 |
| | | 12 | ... | 588 0 |
| | | 13 | ... | 637·0 |
| | | 14 | ... | 686·0 |
| | | 15 | ... | 735·0 |
| 8 | by | 2 | ... | 128·0 |
| | | 2½ | ... | 160·0 |
| | | 3 | ... | 192 0 |
| | | 3½ | ... | 224·0 |
| | | 4 | ... | 256 0 |
| | | 5 | ... | 320·0 |
| | | 6 | ... | 384 0 |
| | | 7 | ... | 448 0 |
| | | 8 | ... | 512·0 |
| | | 9 | ... | 576·0 |
| | | 10 | ... | 640·0 |
| | | 11 | ... | 704·0 |
| | | 12 | ... | 768·0 |
| | | 13 | ... | 832·0 |
| | | 14 | ... | 896·0 |
| | | 15 | ... | 960·0 |
| 9 | by | 2 | ... | 162·0 |
| | | 2½ | ... | 202·0 |
| | | 3 | ... | 243·0 |
| | | 3½ | ... | 283 5 |
| | | 4 | ... | 324·0 |
| | | 5 | ... | 405·0 |
| | | 6 | ... | 486·0 |
| | | 7 | ... | 567·0 |
| | | 8 | ... | 648·0 |
| | | 9 | ... | 729·0 |

TABLE OF THE STRENGTH OF RED PINE (*continued*).

| Depth. | Breadth. | Cwt. |
|---|---|---|
| 9 by | 10 | 810·0 |
| | 11 | 891·0 |
| | 12 | 972 0 |
| | 13 | 1053 0 |
| | 14 | 1134·0 |
| | 15 | 1215·0 |
| 0 by | 2 | 200·0 |
| | 2½ | 250·0 |
| | 3 | 300·0 |
| | 3½ | 350·0 |
| | 4 | 400·0 |
| | 5 | 500·0 |
| | 6 | 600·0 |
| | 7 | 700 0 |
| | 8 | 800 0 |
| | 9 | 900·0 |
| | 10 | 1000 0 |
| | 11 | 1100·0 |
| | 12 | 1200·0 |
| | 13 | 1300 0 |
| | 14 | 1400·0 |
| | 15 | 1500·0 |
| 11 by | 2 | 242·0 |
| | 2½ | 302 5 |
| | 3 | 363·0 |
| | 3½ | 423·5 |
| | 4 | 484·0 |
| | 5 | 605·0 |
| | 6 | 726·0 |
| | 7 | 847 0 |
| | 8 | 968·0 |
| | 9 | 1089 0 |
| | 10 | 1210·0 |
| | 11 | 1331·0 |
| | 12 | 1452 0 |
| | 13 | 1573·0 |
| | 14 | 1694 0 |
| | 15 | 1815·0 |
| 12 by | 2 | 288·0 |
| 12 by | 2½ | 360·0 |
| | 3 | 432 0 |
| | 3½ | 504·0 |
| | 4 | 576·0 |
| | 5 | 720·0 |
| | 6 | 864·0 |
| | 7 | 1008 0 |
| | 8 | 1152·0 |
| | 9 | 1296 0 |
| | 10 | 1440 0 |
| | 11 | 1584·0 |
| | 12 | 1728·0 |
| | 13 | 1872·0 |
| | 14 | 2016·0 |
| | 15 | 2160·0 |
| 13 by | 2 | 338·0 |
| | 2½ | 422·5 |
| | 3 | 507·0 |
| | 3½ | 591·5 |
| | 4 | 676·0 |
| | 5 | 845 0 |
| | 6 | 1014·0 |
| | 7 | 1183·0 |
| | 8 | 1352·0 |
| | 9 | 1521·0 |
| | 10 | 1690 0 |
| | 11 | 1859·0 |
| | 12 | 2028·0 |
| | 13 | 2197·0 |
| | 14 | 2366·0 |
| | 15 | 2535·0 |
| 14 by | 2 | 392 0 |
| | 2½ | 490·0 |
| | 3 | 588·0 |
| | 3½ | 686·0 |
| | 4 | 784·0 |
| | 5 | 980·0 |
| | 6 | 1176·0 |
| | 7 | 1372·0 |
| | 8 | 1568·0 |
| 14 by | 9 | 1764·0 |
| | 10 | 1960·0 |
| | 11 | 2156·0 |
| | 12 | 2352·0 |
| | 13 | 2548 0 |
| | 14 | 2744·0 |
| | 15 | 2940·0 |
| 15 by | 2 | 450·0 |
| | 2½ | 562 5 |
| | 3 | 675·0 |
| | 3½ | 787·5 |
| | 4 | 900·0 |
| | 5 | 1125·0 |
| | 6 | 1350·0 |
| | 7 | 1575 0 |
| | 8 | 1800 0 |
| | 9 | 2025·0 |
| | 10 | 2250 0 |
| | 11 | 2475 0 |
| | 12 | 2700·0 |
| | 13 | 2925·0 |
| | 14 | 3150·0 |
| | 15 | 3375·0 |
| 16 by | 2 | 512·0 |
| | 2½ | 640 0 |
| | 3 | 768 0 |
| | 3½ | 896·0 |
| | 4 | 1024 0 |
| | 5 | 1280·0 |
| | 6 | 1536·0 |
| | 7 | 1792 0 |
| | 8 | 2048·0 |
| | 9 | 2304·0 |
| | 10 | 2560·0 |
| | 11 | 2816·0 |
| | 12 | 3072 0 |
| | 13 | 3328 0 |
| | 14 | 3584·0 |
| | 15 | 3840·0 |
| | 16 | 4096 0 |

EXAMPLE.

Required the strength of a piece of timber 20 feet clear bearing, and 14 inches deep by 12 inches wide.

Opposite the scantling 14 by 12 will be found 2352·0 cwt. Divide this by 20 feet and the result will be 117·6 cwt.

The comparative strength of various scantlings may also be seen at a glance. Also the comparative strength of a piece of timber laid flatwise, and other of the same dimensions on edge.

### Strength of Ironbark and Stringybark.

The remarks at the head and foot of last Table apply also to this—
D signifies depth and B breadth.

| D. B. in. in. | Iron-bark. cwt. | Stringy-bark. cwt. | D. B. in. in. | Iron-bark. cwt. | Stringy-bark. cwt. | D. B. in. in. | Iron-bark. cwt. | Stringy-bark. cwt. |
|---|---|---|---|---|---|---|---|---|
| 2 by 1½ | 10.2 | 8.2 | 5 by 2 | 85 | 68. | 7 by 5 | 417 | 333. |
| 2 | 13.6 | 10.9 | 2½ | 106 | 85. | 6 | 500 | 400. |
| 3 | 20.4 | 16.3 | 3 | 128 | 102. | 7 | 583 | 466. |
| 4 | 27.2 | 21.8 | 3½ | 149 | 119. | 8 | 666 | 533. |
| 5 | 34.0 | 27.2 | 4 | 170 | 136. | 9 | 750 | 600. |
| 6 | 40.8 | 32.6 | 5 | 213 | 170. | 10 | 833 | 666. |
| 7 | 47.6 | 38.1 | 6 | 255 | 204. | 11 | 916 | 733. |
| 8 | 54.4 | 43.5 | 7 | 298 | 238. | 12 | 1000 | 800. |
| 9 | 61.2 | 49.0 | 8 | 340 | 272. | 13 | 1083 | 866. |
| 10 | 68.0 | 54.4 | 9 | 383 | 306. | 14 | 1166 | 933. |
| 11 | 74.8 | 59.9 | 10 | 425 | 340. | 15 | 1250 | 1000. |
| 12 | 81.6 | 65.3 | 11 | 468 | 374. | | | |
| | | | 12 | 510 | 408. | 8 by 2 | 228 | 174 |
| 3 by 2 | 30.6 | 24.5 | 13 | 553 | 442. | 2½ | 272 | 218 |
| 2½ | 38.2 | 30.6 | 14 | 595 | 476. | 3 | 326 | 261 |
| 3 | 45·9 | 36.7 | 15 | 638 | 510. | 3½ | 381 | 305 |
| 4 | 61.2 | 49.0 | | | | 4 | 435 | 348 |
| 5 | 76.5 | 61.2 | 6 by 2 | 122 | 98. | 5 | 544 | 435 |
| 6 | 91.8 | 73.4 | 2½ | 153 | 122. | 6 | 653 | 522 |
| 7 | 107 | 85.7 | 3 | 184 | 147. | 7 | 762 | 609 |
| 8 | 122 | 97.9 | 3½ | 214 | 171. | 8 | 870 | 696 |
| 9 | 138 | 110. | 4 | 245 | 196. | 9 | 979 | 783 |
| 10 | 153 | 122. | 5 | 306 | 245. | 10 | 1088 | 870 |
| 11 | 168 | 135. | 6 | 367 | 294. | 11 | 1196 | 957 |
| 12 | 184 | 147. | 7 | 428 | 343. | 12 | 1306 | 1044 |
| | | | 8 | 490 | 392. | 13 | 1414 | 1132 |
| 4 by 2 | 54.4 | 43.5 | 9 | 551 | 441. | 14 | 1523 | 1219 |
| 2½ | 68.0 | 54.4 | 10 | 612 | 490. | 15 | 1632 | 1306 |
| 3 | 81.6 | 65.3 | 11 | 673 | 539 | | | |
| 3½ | 95.2 | 76.2 | 12 | 734 | 588 | 9 by 2 | 275 | 220 |
| 4 | 109 | 87.1 | 13 | 796 | 636 | 2½ | 343 | 275 |
| 5 | 136 | 109. | 14 | 857 | 685 | 3 | 413 | 330 |
| 6 | 163 | 131. | 15 | 918 | 734 | 3½ | 482 | 386 |
| 7 | 190 | 152. | | | | 4 | 551 | 441 |
| 8 | 218 | 174. | 7 by 2 | 167 | 133. | 5 | 689 | 551 |
| 9 | 245 | 196. | 2½ | 208 | 167. | 6 | 826 | 661 |
| 10 | 272 | 218. | 3½ | 250 | 200. | 7 | 964 | 771 |
| 11 | 299 | 239. | 3 | 292 | 233. | 8 | 1102 | 881 |
| 12 | 326 | 261. | 4 | 333 | 267. | 9 | 1239 | 991 |
| | | | | | | 10 | 1377 | 1101 |

STRENGTH OF IRONBARK AND STRINGYBARK.—*Continued.*

The remarks at the head and foot of last Table apply also to this—

D signifies depth and B breadth.

| D. in. | B. in. | Iron-bark. cwt. | St'ngy-bark. cwt. |
|---|---|---|---|
| 9 by | 11 | 1515 | 1212 |
| | 12 | 1652 | 1322 |
| | 13 | 1790 | 1432 |
| | 14 | 1928 | 1542 |
| | 15 | 2066 | 1652 |
| 10 by | 2 | 340 | 272 |
| | 2½ | 425 | 340 |
| | 3 | 510 | 408 |
| | 3½ | 595 | 476 |
| | 4 | 680 | 544 |
| | 5 | 850 | 680 |
| | 6 | 1020 | 816 |
| | 7 | 1190 | 952 |
| | 8 | 1360 | 1088 |
| | 9 | 1530 | 1224 |
| | 10 | 1700 | 1360 |
| | 11 | 1870 | 1496 |
| | 12 | 2040 | 1632 |
| | 13 | 2210 | 1768 |
| | 14 | 2380 | 1904 |
| | 15 | 2550 | 2040 |
| 11 by | 2 | 411 | 329 |
| | 2½ | 514 | 411 |
| | 3 | 617 | 494 |
| | 3½ | 720 | 576 |
| | 4 | 823 | 658 |
| | 5 | 1029 | 823 |
| | 6 | 1235 | 987 |
| | 7 | 1440 | 1152 |
| | 8 | 1646 | 1316 |
| | 9 | 1851 | 1481 |
| | 10 | 2057 | 1646 |
| | 11 | 2263 | 1810 |
| | 12 | 2468 | 1975 |
| | 13 | 2674 | 2139 |
| | 14 | 2880 | 2304 |
| | 15 | 3085 | 2468 |
| 12 by | 2 | 490 | 392 |
| 12 by | 2½ | 612 | 490 |
| | 3 | 734 | 588 |
| | 3½ | 856 | 685 |
| | 4 | 979 | 783 |
| | 5 | 1224 | 979 |
| | 6 | 1468 | 1175 |
| | 7 | 1714 | 1371 |
| | 8 | 1958 | 1567 |
| | 9 | 2203 | 1763 |
| | 10 | 2448 | 1958 |
| | 11 | 2693 | 2154 |
| | 12 | 2938 | 2350 |
| | 13 | 3182 | 2546 |
| | 14 | 3427 | 2742 |
| | 15 | 3672 | 2938 |
| 13 by | 2 | 575 | 460 |
| | 2½ | 718 | 575 |
| | 3 | 862 | 690 |
| | 3½ | 1006 | 804 |
| | 4 | 1149 | 919 |
| | 5 | 1437 | 1149 |
| | 6 | 1724 | 1379 |
| | 7 | 2011 | 1609 |
| | 8 | 2298 | 1839 |
| | 9 | 2586 | 2069 |
| | 10 | 2873 | 2298 |
| | 11 | 3160 | 2528 |
| | 12 | 3448 | 2758 |
| | 13 | 3735 | 2988 |
| | 14 | 4022 | 3218 |
| | 15 | 4310 | 3448 |
| 14 by | 2 | 666 | 533 |
| | 2½ | 833 | 666 |
| | 3 | 1000 | 800 |
| | 3½ | 1166 | 933 |
| | 4 | 1333 | 1066 |
| | 5 | 1666 | 1333 |
| | 6 | 1999 | 1599 |
| | 7 | 2332 | 1866 |
| | 8 | 2666 | 2132 |
| 14 by | 9 | 2999 | 2399 |
| | 10 | 3332 | 2666 |
| | 11 | 3665 | 2932 |
| | 12 | 3998 | 3299 |
| | 13 | 4332 | 3465 |
| | 14 | 4665 | 3732 |
| | 15 | 4998 | 3998 |
| 15 by | 2 | 765 | 612 |
| | 2½ | 956 | 765 |
| | 3 | 1148 | 918 |
| | 3½ | 1339 | 1071 |
| | 4 | 1530 | 1224 |
| | 5 | 1913 | 1530 |
| | 6 | 2295 | 1836 |
| | 7 | 2678 | 2142 |
| | 8 | 3060 | 2448 |
| | 9 | 3443 | 2754 |
| | 10 | 3825 | 3060 |
| | 11 | 4208 | 3366 |
| | 12 | 4590 | 3672 |
| | 13 | 4973 | 3978 |
| | 14 | 5355 | 4284 |
| | 15 | 5738 | 4590 |
| 16 by | 2 | 870 | 696 |
| | 2½ | 1088 | 870 |
| | 3 | 1306 | 1044 |
| | 3½ | 1523 | 1219 |
| | 4 | 1741 | 1393 |
| | 5 | 2176 | 1741 |
| | 6 | 2611 | 2089 |
| | 7 | 3046 | 2437 |
| | 8 | 3482 | 2785 |
| | 9 | 3917 | 3133 |
| | 10 | 4352 | 3481 |
| | 11 | 4787 | 3830 |
| | 12 | 5222 | 4178 |
| | 13 | 5668 | 4526 |
| | 14 | 6093 | 4874 |
| | 15 | 6528 | 5222 |
| | 16 | 6963 | 5571 |

N.B.—In using the tables showing the strength of Baltic red pine, Iron bark and Stringy bark, the length of the bearers should not exceed 24 times their depth.

## Strength of Spotted Gum and Box.

The remarks at head and foot of the first Table apply also to this--
D signifies depth and B breadth.

| D in. | B. in. | Spotted Gum cwt. | Box. cwt. | D in. | B. in. | Spotted Gum. cwt. | Box. cwt. | D in. | B. in. | Spotted Gum. cwt. | B ox. cwt. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 by | 1½ | 9.1 | 10.9 | 5 by | 2 | 76 | 91 | 7 by | 5 | 375 | 450 |
| | 2 | 12.2 | 14 6 | | 2½ | 95 | 114 | | 6 | 450 | 540 |
| | 3 | 18.3 | 21.9 | | 3 | 115 | 138 | | 7 | 524 | 629 |
| | 4 | 24.3 | 29 1 | | 3½ | 134 | 161 | | 8 | 599 | 718 |
| | 5 | 30.6 | 36.7 | | 4 | 153 | 183 | | 9 | 675 | 810 |
| | 6 | 36 7 | 44.0 | | 5 | 191 | 229 | | 10 | 749 | 898 |
| | 7 | 42.8 | 51 3 | | 6 | 229 | 275 | | 11 | 824 | 989 |
| | 8 | 48 9 | 58 6 | | 7 | 268 | 321 | | 12 | 900 | 1080 |
| | 9 | 55 1 | 66.1. | | 8 | 306 | 367 | | 13 | 974 | 1168 |
| | 10 | 61.2 | 73.4 | | 9 | 344 | 413 | | 14 | 1049 | 1258 |
| | 11 | 67.3 | 80.7 | | 10 | 382 | 458 | | 15 | 1125 | 1350 |
| | 12 | 73.4 | 88.1 | | 11 | 421 | 505 | | | | |
| | | | | | 12 | 459 | 551 | | | | |
| | | | | | 13 | 497 | 596 | 8 by | 2 | 201 | 241 |
| 3 by | 2 | 27. | 33. | | 14 | 535 | 642 | | 2½ | 245 | 294 |
| | 2½ | 34.4 | 46.3 | | 15 | 574 | 689 | | 3 | 293 | 351 |
| | 3 | 41.3 | 49.5 | | | | | | 3½ | 343 | 411 |
| | 4 | 55.1 | 66.1 | | | | | | 4 | 391 | 469 |
| | 5 | 68.8 | 82.4 | 6 by | 2 | 110 | 132 | | 5 | 489 | 586 |
| | 6 | 82.6 | 99.1 | | 2½ | 137 | 164 | | 6 | 587 | 767 |
| | 7 | 96.3 | 105.5 | | 3 | 165 | 198 | | 7 | 685 | 822 |
| | 8 | 109.9 | 131.8 | | 3½ | 192 | 230 | | 8 | 783 | 939 |
| | 9 | 124. | 149. | | 4 | 220 | 264 | | 9 | 881 | 1057 |
| | 10 | 137. | 164. | | 5 | 275 | 330 | | 10 | 979 | 1175 |
| | 11 | 151. | 181. | | 6 | 330 | 396 | | 11 | 1076 | 1291 |
| | 12 | 165. | 198. | | 7 | 385 | 462 | | 12 | 1175 | 1410 |
| | | | | | 8 | 441 | 529 | | 13 | 1273 | 1527 |
| | | | | | 9 | 496 | 595 | | 14 | 1376 | 1651 |
| 4 by | 2 | 50 | 60 | | 10 | 551 | 661 | | 15 | 1469 | 1763 |
| | 2½ | 61 | 73 | | 11 | 606 | 727 | | | | |
| | 3 | 73 | 88 | | 12 | 661 | 793 | 9 by | 2 | 247 | 296 |
| | 3½ | 86 | 103 | | 13 | 716 | 859 | | 2½ | 309 | 370 |
| | 4 | 98 | 118 | | 14 | 770 | 924 | | 3 | 371 | 445 |
| | 5 | 122 | 146 | | 15 | 826 | 1091 | | 3½ | 434 | 521 |
| | 6 | 147 | 176 | | | | | | 4 | 496 | 595 |
| | 7 | 171 | 205 | | | | | | 5 | 620 | 744 |
| | 8 | 196 | 235 | 7 by | 2 | 150 | 180 | | 6 | 743 | 891 |
| | 9 | 220 | 264 | | 2½ | 187 | 224 | | 7 | 867 | 1042 |
| | 10 | 245 | 294 | | 3 | 225 | 270 | | 8 | 991 | 1189 |
| | 11 | 269 | 323 | | 3½ | 262 | 314 | | 9 | 1115 | 1338 |
| | 12 | 293 | 352 | | 4 | 300 | 360 | | 10 | 1239 | 1486 |

## Strength of Spotted Gum and Box.

The remarks at the head and foot of the first Table apply also to this
D signifies depth and B breadth.

| D. in. | B. in. | Spotted Gum. cwt. | Box. cwt. | D in. | B. in. | Spotted Gum cwt. | Box. cwt. | D. in. | B. in. | Spotted Gum. cwt. | Box cwt. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 by | 11 | 1363 | 1635 | 12 by | 2½ | 551 | 661 | 14 by | 9 | 2699 | 3238 |
| | 12 | 1487 | 1784 | | 3 | 661 | 795 | | 10 | 2999 | 3599 |
| | 13 | 1561 | 1873 | | 3½ | 770 | 924 | | 11 | 3298 | 3957 |
| | 14 | 1736 | 2083 | | 4 | 881 | 1057 | | 12 | 3648 | 4377 |
| | 15 | 1859 | 2231 | | 5 | 1101 | 1321 | | 13 | 3898 | 4677 |
| | | | | | 6 | 1321 | 1565 | | 14 | 4198 | 5037 |
| 10 by | 2 | 306 | 367 | | 7 | 1542 | 1850 | | 15 | 4498 | 5397 |
| | 2½ | 382 | 458 | | 8 | 1762 | 2114 | | | | |
| | 3 | 459 | 551 | | 9 | 1983 | 2379 | 15 by | 2 | 668 | 825 |
| | 3½ | 535 | 642 | | 10 | 2203 | 2643 | | 2½ | 860 | 1032 |
| | 4 | 612 | 734 | | 11 | 2423 | 2907 | | 3 | 1033 | 1239 |
| | 5 | 765 | 918 | | 12 | 2644 | 3173 | | 3½ | 1205 | 1446 |
| | 6 | 918 | 1101 | | 13 | 2864 | 3437 | | 4 | 1377 | 1652 |
| | 7 | 1071 | 1285 | | 14 | 3084 | 3701 | | 5 | 1721 | 2065 |
| | 8 | 1224 | 1469 | | 15 | 3305 | 3866 | | 6 | 2065 | 2478 |
| | 9 | 1377 | 1632 | | | | | | 7 | 2410 | 2892 |
| | 10 | 1530 | 1836 | 13 by | 2 | 517 | 620 | | 8 | 2754 | 3305 |
| | 11 | 1683 | 2019 | | 2½ | 646 | 775 | | 9 | 3098 | 3717 |
| | 12 | 1836 | 2203 | | 3 | 726 | 871 | | 10 | 3442 | 4130 |
| | 13 | 1989 | 2387 | | 3½ | 905 | 1086 | | 11 | 3787 | 4542 |
| | 14 | 2142 | 2570 | | 4 | 1034 | 1241 | | 12 | 4131 | 4955 |
| | 15 | 2295 | 2754 | | 5 | 1293 | 1541 | | 13 | 4475 | 5370 |
| | | | | | 6 | 1551 | 1861 | | 14 | 4819 | 5782 |
| 11 by | 2 | 370 | 444 | | 7 | 1810 | 2172 | | 15 | 5165 | 6196 |
| | 2½ | 462 | 554 | | 8 | 2068 | 2481 | | | | |
| | 3 | 555 | 666 | | 9 | 2327 | 2792 | 16 by | 2 | 783 | 939 |
| | 3½ | 648 | 777 | | 10 | 2585 | 3102 | | 2½ | 979 | 1174 |
| | 4 | 740 | 888 | | 11 | 2844 | 3413 | | 3 | 1025 | 1220 |
| | 5 | 926 | 1111 | | 12 | 3103 | 3723 | | 3½ | 1371 | 1645 |
| | 6 | 1106 | 1327 | | 13 | 3361 | 4033 | | 4 | 1567 | 1880 |
| | 7 | 1296 | 1555 | | 14 | 3620 | 4344 | | 5 | 1958 | 2349 |
| | 8 | 1481 | 1777 | | 15 | 3879 | 4655 | | 6 | 2350 | 2820 |
| | 9 | 1666 | 1999 | | | | | | 7 | 2741 | 3289 |
| | 10 | 1851 | 2221 | 14 by | 2 | 600 | 720 | | 8 | 3133 | 3759 |
| | 11 | 2036 | 2443 | | 2½ | 750 | 900 | | 9 | 3575 | 4290 |
| | 12 | 2221 | 2665 | | 3 | 900 | 1080 | | 10 | 3916 | 4699 |
| | 13 | 2406 | 2887 | | 3½ | 1049 | 1259 | | 11 | 4308 | 5169 |
| | 14 | 2592 | 3110 | | 4 | 1200 | 1440 | | 12 | 4700 | 5640 |
| | 15 | 2776 | 3331 | | 5 | 1500 | 1800 | | 13 | 5097 | 6116 |
| | | | | | 6 | 1800 | 2160 | | 14 | 5483 | 6579 |
| | | | | | 7 | 2099 | 2519 | | 15 | 5875 | 7050 |
| 12 by | 2 | 441 | 529 | | 8 | 2399 | 2878 | | 16 | 6267 | 7520 |

**Giving the Locality where obtained or manufactured.**

**Basalt or Bluestone and Diorite.**

Although not plentiful near Sydney, is generally distributed throughout the eastern half of the colony, and is well adapted for road metal, curbing and channelling, tar concrete, &c. It will be found at or near the following towns south of Sydney :—Camden, Campbelltown, Berrima, Nattai, Robertson, Murrimba, Wollondilly, and Cookbundoon Rivers ; Pomeroy, near Goulburn, Crookwell, Boorowa, Gundagai, Coolac ; near Tumut, near Adelong, Tumberumba, Yarrangobi, Kiandra, Seymour, Cooma, Cathcart, and Wyndham, near Bombala, near Bega, near Moruya, Jervis Bay, Farnham, Kiama, Jamberoo, Macquarie Rivulet near Lake Illawarra, Pennant Hills, near Sydney. One of the finest blue metal quarries was opened in the district of Mittagong.

**Kiama.**—Large quantities of blue metal are obtained from Kiama.

To the west of Sydney, basalt is found near Liverpool and Richmond, at Emu Plains near Penrith, at Rockley, Rydal, Mount Victoria, near Bathurst, Blayney, Frederic, Orange, the Canoblas, Currajong, near Parkes, and Lake Cudjullagong, on the Lachlan River.

To the north-west it is found at Hill End and Tamberoora, Hargreaves, Sofala, Newrea, Wellington, Mudgee, Dubbo and Rylstone, also at Crete, Grestore, Muswellbrook, Scone, Murrurundi, Wallabadah, Doughboy Hollow, north-west to Coonabarrabran.

To the north it is found near Gloucester, near Stroud, on the Hastings River, near Port Macquarie, West Kempsey, Nundle, Tamworth, near Walcha, near Armidale, Uralla, Falconer, Glen Innes, near Newtown Boyd, near Gordon and Tabulam on the Clarence River, Lismore, &c., on the Richmond River, the Tweed River, also at Deepwater on the Severn Rivers, Wellingrove, Byron, Inverell, &c.

## BRICKS.

**Fire Clay** and superior bricks are made at Enfield, Newtown, Lithgow Valley, Brisbane Water, Wollongong, Mudgee, Wallerawang, Bulli, Granville, Yass, Bathurst, Dapto, Tamworth, Armidale, Broken Hill, Albury, Vegetable Creek, &c., and may be looked for generally on the coal measures and the country between Berrima and the Hawkesbury River.

## GRANITE.

**Granite** is found at Tamworth, Trial Bay, Gabo Island, Moruya, &c. It abounds in many parts of the colony, and often near goldfields, and would be useful for rubble or paving, curbing or guttering. The polished granite columns of the Post-office at Sydney are Moruya granite.

A **finer grained granite** has also been procured from Montague Island, about 20 miles south of Moruya. Blocks of granite, weighing 16 tons, were brought from the above localities and used in the General Post Office, Sydney.

A **light red granite** is found at Trial Bay, and has been used there in the erection of a lighthouse, &c.

## GYPSUM.

**Gypsum** (*sulphate of lime*) crystallised and amorphous or lumpy, is found in large quantities near Mount Browne goldfields, Balranald. As before stated, it is easily burnt into plaster of Paris, as limestone is burnt into lime.

Limestone, dense blue, from Port Stephens ; cream colour, with brown veins, from Mudgee. Limestone and marble are both converted into lime, the marble being limestones hard enough to receive a polish ; there are also tertiary and tufaceous limestones, used chiefly for lime.

From the Mineral Statistics of New South Wales, I find that a grey crystalline limestone is found near Wollongong, containing:—Carbonate of lime, 74.3 ; carbonate of magnesia, 0.8 ; alumina, 7.3 ; oride of iron, 3.1 ; phosphoric oxide, 0.4 ; silica, 10.7 ; organic matter and water, 3.4. This limestone when burnt gives a brownish hydraulic lime.

**Bulli Purple Limestone** shows a 5-foot seam.

**Mountain Limestone.**—The Fish River, Binda or Jenolan Caves, Yarrangobilli Caves, Wellington Caves, and Cavan Caves, near Yass, are in this formation.

Limestone is also found at Kempsey, Nundle, Murrurundi, Scone, Copeland, Dubbo, Wyndoyer, Ironbarks, Parkes, Forbes, Orange, Cow Flat, Caloola, Tuenna, near Junee, Jugiong, Yass, Goulburn, Gundagai, Adelong, Kiandra, Braidwood, Wingham, Gloucester, Stroud, Ophir, Wallerawang, Rockley, Bookham, Queenbeyan, Bombala, &c., being most prevalent in the silurian or goldfields formation, and extensive lime kilns have lately been erected at Bowning, near Yass, and also at Piper's Flat.

## MARBLE.

Some of the finest and soundest marbles in the world are found in New South Wales, coming from the district of Orange and Bathurst. The quarries at Caloola Creek, near Newbridge, Borenore, and Fernbrook, produce coloured marble of great beauty, and white marble of great purity. The base of Queen Victoria's Memorial statue in Melbourne is of this Caloola marble. Her Majesty's Theatre, Sydney, vestibule, and staircase, is Borenore rouge, Breccii and St. Annes.

Queen Alexandra rouge and variegated, most brilliant in tones.

There is also good red and white marble at Tamworth, and black marble at Biddenlake.

**Marulan Marble.**—Grey, reddish purple, and black. The quarries are now idle.

**Cow Flat** marble is white, and was used with the black marble from Marulan in flooring the great hall of the Sydney University.

**Wallerawang Marble** (white, cream and dove colour), can be obtained of any size. The quarries are seven miles from Wallerawang railway station. The Portland cement quarries are in that district.

## FREESTONE.

**Sandstone** (free), suitable for building, was exhibited from Sydney and suburbs, and also from Willoughby, Manly, Brisbane Water, Lithgow Valley and Parramatta. These are from the same geological formation as the coal measures, and therefore similar to the Sydney (free) sandstone so largely used in the best buildings of Sydney, &c. Those from Manly and Pyrmont make good grindstones.

**Sandstone,** varying greatly in hardness and cost of dressing, is obtained from Pyrmont, Sydney. Ordinary free sandstones are also quarried at Randwick, Mosman's Bay, North Shore, Hunter's Hill, Parramatta, Waverley, and along the Illawarra line.

**Pyrmont Sandstone,** from the lower beds, withstood a pressure by Professor Warren when applied to 3 inch cubes of 39,000lbs., and to 4inch cubes of 100,000lbs. An equal sided cube foot sustained a pressure for 20 minutes of 200 tons when tested.

**Good Sandstone,** suitable for building, is also found at East Maitland, Morpeth, Clarence Town, Muswellbrook, Rutherford, and Ravensfield. All these are similar to the Sydney sandstone, and generally of a creamy or sienna colour. At Paterson, on the Hunter River, it is of a greenish tinge, and at Wollombi of a pink and light brown tint.

**Sandstone** (*Silurian*), from Albury and Mudgee, Goulburn, Bukingbong, and Narrandera. These sandstones are harder and in smaller beds than those from the coal measures, and may be looked for on all the goldfields. They are not so good for building blocks, being strongly laminated, or in well-defined beds, and are therefore superior as flagstones.

**Grey Stone** is found at Molong and Orange in level beds and is good for flagging, steps and sills having been used in Government buildings there.

The price for clean chiselling this stone is 2s. per super. foot.

## SLATE.

**Silurian or goldfields formation.**—A third class slate, from Kerraway, near Goulburn.

**Cookbundoon Slate.**—The verandah of Dr. Moore's house in Elizabeth-street, Sydney, was paved with this slate about 1880, and may now be seen not to be a durable slate.

**South Gundagai Slate.**—A superior kind of slate is found here, and is worked by the Australian Slate Company.

**Bathurst.**—A slate quarry was opened in 1881 at Millamurrah, near Bathurst, 18,000 slates taken out, and machinery obtained to work the quarry on a large scale.

Slate of different degrees of hardness is found on all the goldfields, but little of it is fit for slabs or roofing.

## TERRA COTTA.

**Terra Cotta** of a superior class is made at the Sydney potteries, Enfield, Camperdown, Granville, St. Peters; also at Lithgow Valley and Albury, &c.

## TRACHYTE.

Is found at Mittagong and Bowral, and is used in the railway bridge over the Hawkesbury River, to resist decay from sea water.

**Trachyte,** light blue, from Bowral, Mittagong and Clarence Town. Quarries have been recently opened at Bowral, and the stone used for the Centennial Hospital at Camden. It has also been used in the basements and lower stories of Government and other buildings in Sydney, the piers of entrance to the Garden Palace, &c., besides kerbing and guttering. The cost of working is between bluestone and Adelaide marble or Moruya granite. (See stonecutting).

## BUILDING TIMBERS, N.S.W.

**Building Timber.**—Australian timber, because of its superior qualities, is appreciated, not only in Australia, but in America and Europe. The blue-gums are the largest and highest trees in the world, eclipsing the gigantic trees of California. An American writer refers to a tree planted in Algiers 15 years ago, which had attained the size of an oak 100 years old. We also learn from various sources that the eucalyptus, or gum trees, have been largely planted in Italy at all elevations above the sea, and where planted near miasmitic swamps, have changed those localities into healthy spots.

New South Wales, as the mother state, is well timbered in the settled districts, within 50 miles of the coast, that is, between the coast range and the coast; many of the finest timbered districts being inaccessible to the State generally. A few of the best known localities are :—Mudgee, Richmond and Clarence Rivers, Tamworth, Inverell, and to the north of Sydney to Newcastle; while from the south, Bega, Dapto, Camden, Wollongong, Illawarra, Albury, &c., good timbers are found, although not generally up to the standard of the Northern Rivers. Between Illawarra and Bega some of the finest timber is found, more especially near Ulladulla, where several vessels were built many years ago, and since then villas have been erected, containing some of the finest scantlings and flooring in the colony.

Beech is found at Bellinger and Richmond Rivers. The bark is smooth and about ¾ inch thick. There are two well-known kinds, white and yellow. The white is generally from the northern rivers. This useful timber is chiefly used for flooring vessels, houses, balconies, &c., and is said not to shrink in seasoning or drying, as it generally shows the sap when fresh wrought. It is very rarely seasoned, even when kept for years, and on that account is said not to take glue readily. Size three or four feet in diameter, barrel 40 to 50 feet. The Crown Beech is inferior to the above.

Blue Gum *(Eucalyptus ylobulus)*, 6 to 10 feet diameter, and barrel or trunk 80 to 100 feet. The best timbers in this district are said to be obtained from the alluvial flats, but elsewhere from the ranges. It is widely and extensively used for piles, *planking wharves, vessels*, and bridges, for railway sleepers, and the construction of railway wagons and trucks, and for building scantlings or carpentry generally. It was said by the late Captain Ferguson that it lasted only from 5 to 8 years when subjected to the attack of sea worms, when used as piles, &c. See building materials of Victoria and Tasmania.

Dr. Mueller says in his Eucalyptographia that Forests of Blue Gum could be more cheaply and easily reared with quicker returns than any other forest tree.

Blackbutt *(Euc. pilularis)*.—The best quality (like most other timbers) is found on the ranges at Lithgow, &c., where it is most free from gumveins. It is much used for flooring, but it is not equal to tallow wood for this purpose. It is very durable; the best trees grow from 3 feet to 7 feet in diameter, and from 50 feet to 80 feet in the barrel. It is said to be even tougher than Ironbark, when subjected to sudden strain or concussion. When used as fencing, the posts will last about five years, and the rails about 12 years.

It is a tree of rapid growth and derives its name from its dark fibrous bark, which is blackest nearest the butt.

Bloodwood, *Euc. Corymbosa*.—It is called Bloodwood from the gum which exudes from it and is found in the concentric circles of the trunk. It is used for fencing, building, &c. Dr. Wools says manna is sometimes found on its leaves, and the bark is useful for its fibre. It is also found in Victoria and Queensland.

Bloodwood (*Mountain*), *Euc. Eximia*, or smooth-bark Bloodwood. The Rev. Robert Collie, F.L.S., says it flourishes in the Blue Mountains, and along the railway beyond the first Zigzag, and may be seen covered with beautiful flowers in the early summer. The bark is more than one inch thick, of a light brown colour, rough and firm in the stem, but smooth in the branches. The wood is light in colour, the leaves are long, sometimes 8 inches in length, and are full of volatile oil.

Box, so called from its resemblance to the European Box.—According to the above table this timber is the strongest known, except teak, being even stronger than ironbark. It is generally of a bright yellow colour, although sometimes of an orange tinge. It must not be confounded with the hollow scrub or bastard box, which is almost worthless for building purposes. When used for fencing, the posts are estimated to last 30 years and the rails much longer. It is the best timber for sleepers, posts, standards, girders, joists, &c.

Forest or Red Mahogany is applied to building purposes, but like scrub box, is too often found hollow, to make it a favorite with the sawyers. Average diameter 2½ feet, height about 50 feet.

Forest Oak (*Casuarina torsiclosa*) is largely used for palings and shingles, staves of casks, &c. Average diameter 18 inches and height 20 feet.

Grey Gum *(Eucalypta saligna)* is found in the North of New South Wales. It is a very hard and durable timber, and is considered nearly equal to Ironbark for strength and durability. Diameter, three to four feet, and height 60 to 70 feet. It lasts from six to eight years when attacked by sea worms.

Ironbark *(Grey)* grows plentifully on the ridges, size two to three feet diameter, and 60 feet in the barrel. For strength and durability it is unrivalled. (See tables of relative strength, &c., as per Index.)

It is also superior to Red Ironbark and is not so easily split; both kinds are used for posts, girders, or standards of buildings, and for railway sleepers, bridges, jetties, and fencing. When exposed in sea water to the attacks of the sea worms it is rapidly destroyed, as stated by Capt Ferguson,

*Euc. sidorophloia* a broad leaved Ironbark is abundant in New South Wales and Victoria.

*Euc. creba* is known as the narrow-leaved or Red Ironbark, and is found throughout the eastern coast of Australia from Sydney northwards and in Victoria. See Building Materials of Victoria.

*Euc. leucoxylon* is the red flowering Ironbark, the flowers resembling peach blossoms; it is not equal in durability to the other Ironbarks.

Lachlan or Dubbo Pine (*Araucaria)* is the name given to the knotty, brittle, yellow pine, found throughout the colony, west of the main or Dividing Range. It is very handsome, and sometimes of a brownish red colour. It looks well varnished or polished for church roofs and joinery. Although not strong, it is generally used for scantlings in house building, fencing, &c., in the western portions of the colony. A fine specimen was exhibited, 2 feet wide, at the Centennial Exhibition.

Mountain Ash (*Euc. Sieberi*) is tough and light, like its English prototype, and is used for oars. It does not split well, and is therefore not suitable for staves. Average diameter three feet, and height 60 to 80 feet.

Messmate, *Euc. obliqua.*—It is a variety of stringy bark, and the wood is dark brownish red like bloodwood.

Peppermint, *Euc. Dealbata*, is found beyond Mudgee, and is a species of Stringy Bark. The Stringy Bark of New England is another species known as *Euc. Macorryuchus.* It is also found in Victoria.

Red Cedar (*Cedrala toona*) is found in most parts of the eastern portion of the colony, and near Nambucra, in the Macleay district. For a description, &c., of this beautiful and favorite timber, I would refer to the Queensland Timbers in these Essays. The forest reserves contain but few young cedars, and large specimens are now very scarce.

Red Gum, or Flooded Gum, is generally found on the banks of rivers below flood level, more especially on the Murray and Murrumbidgee rivers, where it attains an immense size. It is very hard and durable, and so brittle as to generally break when falling ; for fencing it is said to be equal to box. It is good for posts, sleepers, &c., but soon decays at the heart, and is mostly found hollow when full grown.

Rosewood of N.S. Wales, wood red, close grained, and easy to work. Size, sometimes 2½ feet in diameter.

Stringy Bark.—This is one of our best-known timbers, and is largely used for palings, shingles and slabs, on account of its being easily split. It is generally found on the goldfields, and attains immense height and thickness. Its comparative strength will be seen from the tables showing the breaking weight of four of our best timbers. When used as fencing, it is said to last about 11 years for posts and about 18 for rails. It is also found in Victoria and Queensland. The red stringy bark, found near Sydney, as at North Shore, Manly, &c., and westward to the Dividing Range, is known as the *Euc. Capitella*, and is considered the typical stringy bark of New South Wales.

Spotted Gum (*Euc. maculata*) from Jervis Bay, &c., has been found to be next to Ironbark in breaking weight, as per preceding Tables. It has often been used for the poles of bullock drays, and for this purpose has been known to last for 14 years ; as flooring boards it has lasted 40 years without deterioration.

Spotted gum, like the English Oak, can be very easily twisted when steamed.

I deem it of such importance, as to require a table showing the strength of all useful scantlings and bearings which I have cast out for this book. It is used for rods in artesian boring in this colony and Queensland. Its value is now known ; 2,500,000 feet exported in 1906.

Swamp Mahogany (*Eucalyptus Robusta*).—Red or Flooded Gum is found in swampy ground. It is chiefly used for underground work, and is durable and plentiful at Brisbane Water. Diameter, three to six feet, and height 50 feet. It has large flowers and seed vessels ; grows at Manly near the lagoon, and on the flat banks of the Macquarie and other rivers. Mahogany weatherboards, when oiled, take the place of Jarrah or Redwood in the much admired chocolate and white effect in residences now erected.

Tallow Wood (*Eucalyptus microcorys*), is a favourite hardwood for joinery, such as door and window frames, balcony rails, flooring, &c.

It does not shrink, warp, or twist and receives a good smooth face, it is strong, compact, and durable, and is found to the N. and N.W. of Sydney, &c. Most valuable for paving blocks.

*Brisbane Water*, or Broken Bay, about 20 miles north of Port Jackson, supplied Sydney with immense quantities of hardwood. The following well-known timbers are obtained from this locality, also near Byron Bay and the Dorrego. The remarks generally will apply to similar timber found elsewhere, the diameters given are from 3 to 6 feet above ground, and the heights to the lowest branches.

Tea-Tree and Honeysuckle are small, stunted and twisted, they are nevertheless tough and durable, and are chiefly used for boat knees.

Turpentine (*Syncarpia laurifolia*).—This timber is noted for its resisting the attacks of sea grubs when used as piles in wharves and jetties. It is plentiful, and has been extensively used for planking Government bridges, for railway sleepers, fencing, &c. Size, from three to five feet in diameter, and barrel 70 to 80 feet long. It was used in a wharf in Darling Harbour, Sydney, for piles, with the bark on, which remained on below water mark for 23 years, when the plies were found to be perfectly sound and almost free from cobra or sea grub.

In 1870, two samples of wood from the jetty at Bulli were exhibited in Sydney, one was Ironbark, which had been under sea water for three years, and was riddled with the cobra (*terreda navalis*), the other sample was turpentine, which had been subjected to the same test for nine years, and was found to be perfectly sound, for although the cobra had attacked it, its researches were very superficial, owing probably to the essential oil, or flavour of the wood not being palatable to this interesting marine animal. It has been ascertained that Turpentine, Kauri, Totara, and Jarrah are the only Australian timbers that will withstand the destructive effects of the cobra when used for marine purposes. Turpentine is also said to be white ant proof, and probably for the same reason.

Extract from Report, Jan. 5th, 1905, by James Frazer, Engineer-in-Chief for Railways (Existing Lines) :—

Touching upon more modern experience, we recently demolished a jetty in Woolloomooloo Bay which had been standing twenty years. The piles were of unsheathed turpentine, and proved to be so sound that they have been used again in additions to wharves. These piles only showed a few teredo holes in the sapwood, and a little erosion above low-water mark, due to limnoria.

From our experience, which it will be seen is based upon the test of a great many years, it is quite certain that turpentine piles unsheathed are incomparably superior, not only to any other Australian timber, but also to any other obtainable of the same size.

Our opinion of the value of turpentine as a teredo-resisting timber has received such confirmation that we have built several wharves on unsheathed turpentine piles, and we confidently look forward to a life of from thirty to forty years for these wharves.

Woollybutt (*Euc. longifolia*).—The leaves are very long and the fruit or seed vessels large. The bark is brown in young trees and paler in old ones. Dr. Mueller says it could be made into packing paper. It is widely distributed, extending into Queensland and Victoria. The timber is a dark red, not unlike red ironbark. It is used for posts, waggon-work, and wood-paving.

Yellow Pine is a fine working timber, with a beautiful grain, and is well adapted for furniture, for which purpose there is a local demand. It is plentiful, and found up to 3½ft. in diameter, and from 30 to 40ft. high.

## GOVERNMENT REPORTS, from FOREST DEPARTMENT, 1906.

### Suitability of N.S.W. Timbers for Piles.

Extracts from Reports by Mr. James Frazer, Engineer-in-Chief for Existing Lines, under date, Jan. 5th., 1905 :—

Turpentine.—For piles in salt or brackish water, turpentine is the most valuable of all our timbers, not excepting ironbark, as it is less liable to attack from teredo than any other, and in water is very durable, having a life of about 30 years. For piles in fresh water streams, grey gum, white mahogany, tallowwood, and black butt are the best substitutes for ironbark. Life of above timbers, from 25 to 30 years.

For **Sleepers**, the best of all local timbers is ironbark, but other timbers are now employed. The average life of these timbers would be approximately :—

| | | | |
|---|---|---|---|
| Ironbark .. .. | 25 years | Grey Gum .. | 22 years |
| Grey Box .. | 18 ,, | Murray R. Gum | 20 ,, |
| White Stringybark | 18 ,, | Tallowwood .. | 20 ,, |
| White Mahogany | 18 ,, | Blackbutt and Turpentine .. | 16 ,, |

Note shows Turpentine to last better, 30 years, in shade, or immersed in water, than exposed to sun and weather, such as sleepers or wood-paving of streets.

For Bridge work, the most suitable timber is Ironbark, owing to its great strength and durability, being in these respects unequalled by any other New South Wales timbers.

For head stocks, corbels, griders and heavy transomes, ironbark is used exclusively, but for piles, bracing, decking, wing sheeting, &c., other serviceable and cheaper timbers are frequently selected.

For bridge decking and wing sheeting, tallowwood is one of the best timbers, but other timbers, including Grey Gum, Murray Red Gum, Black Butt, White Mahogany, Turpentine and White Stringy Bark, are used,—wallings, bracing, &c., being of the same timbers. In work mentioned, the average life of these timbers should be about 20 years.

Report by Mr. W. Thow, Chief Mechanical Engineer, New South Wales Government Railways, on timbers for carriage and wagon purposes, under date 13th December, 1904 :—

With regard to the New South Wales timbers considered the most suitable for carriage and wagon purposes, we use ironbark, tallow-wood, blackbutt, Sydney blue and spotted gums, red mahogany, woollybutt, beech, rosewood, black-bean, silky oak, and cypress pine.

The principal of these for our work are ironbark and tallow-wood. Both these timbers are strong and durable, and keep their shape in seasoning. The ironbark, being heaviest, is used in cases such as brake-vans, where weight is desired ; but for ordinary carriage and wagon under-frames, where timbers are used, tallow-wood is preferred.

Black-bean is an ornamental timber, dark in colour, and has a grain something like Tasmanian blackwood. It takes polish and varnish well, and retains its shape, shrinking very little in seasoning. It is found to be suitable for panelling and inside framing of carriage work.

Silky oak is a mottled, ornamental timber, suitable for framing or small panel work.

Cypress pine is also an ornamental, well-figured timber, but is not obtainable in large sizes, and is liable to knots. It is sometimes used for small panels in railway carriage work.

In addition to the above, it may be stated that blackwood for framing, and red cedar for panels, are largely used in railway carriage construction.

## CAST IRON SPOUTING, &c.

| Spouting, 6 feet lengths. | 2 in. | 3 in. | 3½ in. | 4 in. | 4½ in. | 6 in. |
|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Spouting, O. G. p. lin. ft. | .. | .. | .. | 0 6 | 0 7 | 0 8 |
| Ditto, half round do. | .. | .. | 0 3½ | 0 4 | 0 5 | 0 6 |
| Down pipes do. | 0 5½ | 0 6 | 0 7 | 0 8 | 1 1 | 1 6 |
| Heads, each .. .. | 3 0 | 3 3 | 3 6 | 4 0 | .. | 5 0 |
| Shoes, each .. .. | 1 0 | 1 6 | 1 9 | 2 0 | .. | 3 0 |
| O.G. angles, each .. .. | .. | .. | .. | 2 6 | 2 9 | 3 0 |
| Half round bends, each . | 1 3 | 2 0 | 2 3 | 2 6 | .. | . |
| Clips, each .. .. .. .. | .. | .. | 0 6 | 0 8 | 0 9 | 0 10 |
| Nozzle pieces, each .. .. | .. | .. | .. | 1 6 | 1 9 | 2 0 |

For weight of the above see Weight of Building Materials.

## TO MAKE WALLS WATERPROOF.

### Sylvester's Process.—Castile Soap and Alum Coats.

First Coat.—Mix ¾lb. Castile Soap to one gallon of water; apply hot with brush, allow 24 hours to dry, then apply.

Second Coat.—Viz., mix ½lb. alum to 4 gal. water; after 24 hours repeat the coats. A chemical glaze is formed which is said to be impervious for years.

**19th August, 1907.**

The following are prices delivered f.o.b., Melbourne, Commonwealth duty paid, and are subject to rise or fall of market after one month from this issue.

## TIMBER.

### Oregon.

Cut to sizes, 1in. thick and over.

| | | | |
|---|---|---|---|
| Up to 40ft. | 16/– | 51/60ft. | 21/– |
| 41/50ft. | 19/– | 61/70ft. | 23/– |

### Hardwood.

**Stock building sizes,** up to 20ft. .. .. .. .. .. 8/9

### Red Deal.

Cut to sizes up to 9in. wide, 3d. ; over 9in., per ft. super .. .. 0 3½

**Yellow Pine,** cut to sizes, per ft. super .. .. .. .. –/4
**Red Pine,** cut to sizes, per ft. super .. .. .. .. –/3

## BULK TIMBER.

### Californian Redwood.

1, 1¼, 1½, 2, 2½, 3, 4, 5, 6in., per 100 super. ft. .. .. .. 22/6

### Yellow Pine.

8 inches wide and over.

1, 1¼, 1½, 2in., per foot .. .. .. .. .. .. –/3¾

### Oregon Pickets.

4ft. 6in. x 3 x 1, square ends, per 100 pieces .. .. .. 16/6

### Oregon Laths.

4ft. 6in. x 1½ x ⅜ (Wall), per 10 bundles of 90 .. .. .. 32/6
4ft. 6in. x 1 x 3/16 (Ceiling), per 10 bundles of 96 .. .. .. 24/–

### Shelvings—Dressed.

American "Crown," 12in., 32/– ; wide .. .. .. .. 34/–
New Zealand White Pine—12 and 14in., 18/– ; 16in., 18/6 ; 18in., 19/–

Prices per 100 super feet.

### Pacific Pine.

Cut to sizes, 14/6. Dressed Shelving, 16/6 per 100 feet super.
Rough Lining, 9in. wide, 6 out of 3in., 6/6 ; 7 out, 5/9 ; 8 out, 5/3 per 100 feet lineal.

## FLOORINGS.

### Kauri.

Prices per 100 feet lineal.

| | | | |
|---|---|---|---|
| 4 x 1¼ T. & G. .. .. | 14/9 | 6 x 1¼ T. & G. .. .. | 18/6 |
| 4 x 1⅛ T. & G. .. .. | 13/6 | 6 x ⅞ T. & G. .. .. | 14/– |
| 4 x ⅞ T. & G. .. .. | 10/– | 3½ x 1 T. & G., Jarrah .. | 9/6 |
| 4 x ⅝ T. & G., V-jointed | 9/– | 5½ x 1 T. & G., Jarrah .. | 13/– |
| 4 x ½ T. & G., V-jointed | 7/9 | 4¼ x ⅞ T. & G., Hardwood | 7/6 |

## FLOORING, LINING, AND WEATHERBOARDS.

Per 100 feet lineal.

| | White. | Red. |
|---|---|---|
| 6 x 1¼ T. & G. .. .. .. .. .. | 10/6 | 11/3 |
| 6 x ⅞ T. & G. .. .. .. .. .. | 10/6 | 9/– |
| 6 x ¾ T. & G. .. .. .. .. .. | 7/9 | 8/– |
| 6½ x ⅝ T. & G., beaded .. .. .. .. | 7/– | 7/6 |
| 6 x ½ T. & G., beaded .. .. .. .. | 6/– | 6/3 |
| 6 x ⅜ T. & G., beaded .. .. .. .. | 5/3 | 5/6 |
| Weatherboards, square edges .. .. .. .. | 6/9 | 7/– |

## MOULDINGS.

Per 100 Lineal Feet.

O.G.—2in., 5/6; 2½in., 6/6; 3in., 7/6.
Dado—1½in. x 1¼in., 7/–; 2in. x 1½in., 9/–.
Cap—3in. x 2in., 15/–; 4in. x 2in., 20/–; 4in. x 3in., 30/–.
Ovolo—1in., 4/6; 1½in., 6/–; 2in., 10/–.
Neck—1½in. x 1in., 5/–; 2in. x 1½in., 7/6.
Insertion—1in., 4/–; 1¼in., 4/6; 1½in., 5/6.
Window Nosing—2½in. x 1½in., 12/–.

### Architraves.

4in. x ⅞in., 10/–; 5in. x ⅞in., 11/6; 5in. x 1¼in., 14/–; 6in. x 1½in., 19/–.

### Beads.

Angle—1in., 4/–; 1¼in., 4/6.
Parting—⅞in. x ⅝in., 4/–.
Stop—⅞in. x ⅝in., 4/6; 1¼in. x ⅝in., 5/6.

### Skirtings.

7in. x ¾in. O.G., 13/6; 9in. x ⅞in. O.G. and DF., 19/–; 11in. x ⅞in. D.F., 22/6; 7in. x 1in. Torus, 16/–.

### Scotias.

1in. x ⅞in., 4/–; 1¼in. x 1⅛in., 5/6; 1½in. x 1¼in., 6/6; 2in. x 1½in., 8/–.

## JOINERY.

### Doors.

6ft. 6in. x 2ft. 6in. x 1¼in., 11/6 ; 1½in., 12/6.
6ft. 8in. x 2ft. 8in. x 1¼in., 12/6 ; 1½in., 13/–.
6ft. 10in. x 2ft. 10in. x 1½in., 14/6 ; 1¾in., 16/6.
7ft. x 3ft. x 1¾in., 17/6 ; 2in., 20/–.
Margin Light Doors, ornamental centres, coloured margins and corners—
6ft. 6in. x 2ft. 6in. x 1½in., 23/– ; 6ft. 8in. x 2ft. 8in. x 1½in., 24/–.

Extras.

Bolection Moulds, 6/– Bead and Butt, 3/–
Raised Panels, 3/– Bead and Flush, 4/–

Door Frame, Margin Lights, and Door, 6ft. 10in. x 2ft. 10in. x 1¾in., raised panels, bolection moulded, for 4ft. 6in. passage, 6in. sidelights, and fanlights to suit, glazed Muranese, with sill, £4/4/–.

### Window.

Sashes and Frames, Weights and Cord.
Glazed 16oz., 2 or 4 lights.

| | Narrow Sill. | Wide Sill. |
|---|---|---|
| 6ft. x 3ft. x 1½in. .. .. .. .. | 24/6 | 25/6 |
| 6ft. x 2ft. 10in. x 1½in. .. .. .. | 23/6 | 24/6 |
| 5ft. 4in. x 2ft. 10in. x 1½in. .. .. .. | 22/– | 23/– |
| 4ft. 8in. x 2ft. 10in. x 1½in. .. .. .. | 21/– | 22/– |
| 4ft. x 2ft. 4in. x 1½in. .. .. .. | 18/– | 19/– |

21oz. Glass, 1/6 extra.

### Triplet Windows.

6ft. x 5ft. over all, centre sashes 6ft. x 2ft. 10in. x 1½in., 2 lights, 10in. sidelights, glazed plain glass .. .. .. .. .. 55/–

**Washtroughs,** 4ft. 6in., 2 compartments .. .. .. .. 30/–
**Colonial Blackwood,** 6in. to 11in. x 1in. .. .. .. .. –/3
12in. and over, 1in. to 6in. .. .. .. .. .. –/3¼

Turnery Sizes.

Up to 3in. x 3in. .. .. .. .. .. .. 15/–
3½in. x 3½in. to 4in. x 4in. .. .. .. .. .. 17/6
5in. x 5in. and 6in. x 6in. .. .. .. .. .. –/3¼
Fiddleback, per super foot .. .. .. .. .. 1/–

**Cedar,** best red colour, 1in. to 6in., 12in., per foot .. .. –/7
**Rosewood,** Scented, similar to Mahogany, per ft. .. .. –/4½

### White Pine.

1st Quality.

12in. and 14in. x 1in. .. .. .. .. .. .. 17/–
16in. x 1in. .. .. .. .. .. .. .. 17/6
18in. x 1in. .. .. .. .. .. .. .. 18/–
12in. and 14in. x ¾in. .. .. .. .. .. 15/6

### Jarrah.

| | | |
|---|---|---|
| Lengths under 6 feets | 3 x 1½, 3 x 2, 4 x 1½, 4 x 2, 4 x 3, 4 x 4, 5 x 3, 5 x 5 | 12/6 |
| ,, 7 to 25 feets | 3 x 1, 3 x 1½, 3 x 2, 4 x 1½, 4 x 2 | 13/6 |
| ,, 7 to 25 feets | 3 x 3, 6 x 4 | 16/6 |
| ,, 7 to 25 feets | 5 x 5, 7 x 1½, 9 x 1¼, 9 x 1½, 6 x 1, 6 x 1¼, 6 x 1½, 7 x 2, 7 x 3, 8 x 2, 9 x 2 | 17/6 |
| ,, 7 to 25 feets | 8 x 3, 8 x 4 | 17/6 |
| ,, 7 to 25 feets | 8 x 6, 9 x 3, 9 x 4, 9 x 6 | 18/– |
| ,, 7 to 25 feets | 8 x 8, 9 x 9, 10 x 10 | 18/6 |
| ,, 7 to 25 feets | 12 x 6, 12 x 9, 12 x 12 | 19/– |

**Pickets**—Oregon, dressed and shaped—4ft., 26/6 ; 4ft. 6in., 26/6 ; 5ft., 27/6 ; Hardwood, rough, plain point—4ft., 8/– ; 4ft. 6in., 9/– 5ft., 10/–.
**Angle Rails**—out of 4 x 4—Hardwood, 6/6 ; Jarrah, 9/6 ; 100ft. lineal.
**Palings**—5 feets, 13/– ; 6 feets, 17/–.
**Fencing Posts**, Split—5ft. 9in. x 6in. x 3in. (Wire), 50/– ; 6ft. 6in. x 7in. x 3½in. (Rail), 60/–.
**Fencing Rails**, Split—9ft. x 7in. x 2½in., 60/– per 100.
**Scaffold Poles**—1/9 each.
**Fencing Wire**—Black, No. 8, 9/6 ; Galvanized, 12/– per cwt.
**Barb Wire**—12 gauge, 14/6 ; 14 gauge, 16/– per cwt.

**LIME,** Waratah, Lilydale .. .. .. .. .. .. 4/–
**CEMENT,** Imported .. .. .. .. .. .. 13/6
**PLASTER,** Knickerbocker, 16/–. Hair, per bag .. .. 3/–

### BRICKS.

Building, per 1000 .. .. .. .. .. .. 45/–
Fire (Colonial), per 1000 .. .. .. .. .. .. £6

### SLATES.

20 x 10 Blue American .. .. .. .. .. .. £10/17/6
20 x 10 Green American .. .. .. .. .. .. £14/7/6
20 x 10 Blue Welsh .. .. .. .. .. .. £14 10/–
**Battens,** 15 out, 9 x 3, Deal, tied in bundles .. .. .. 3/6
,, 15 ,, Pacific Pine .. .. .. .. 2/9
**Sheet Lead,** per lb. 3d. **Solder,** per lb. 1/3.

### GALVANIZED IRON.

**Corrugated Iron** (26 gauge).

| Per ton. | Orb. | Redcliffe. | Globe. |
|---|---|---|---|
| 5 to 8 fts. .. | £23 | £22/10/– | £22/5/– |
| 9fts. .. .. | £24 | £23/10/– | £23/5/– |
| 10ft. .. .. | £25 | £24/10/– | £24/5/– |

### Labour—Curving Corrugated Iron.

Over or under, per sheet .. .. .. .. .. .. –/3
Bullnose, O.G., or Half Circle, per sheet .. .. .. .. .. –/4
Full Circle, per sheet .. .. .. .. .. .. –/6

### Galvanised Plain Iron.

Per Sheet.

| | 26 gauge. | 24 gauge. |
|---|---|---|
| 24in. .. .. .. .. .. .. | 2/3 | 2/9 |
| 30in. .. .. .. .. .. .. | 2/9 | 3/3 |
| 36in. .. .. .. .. .. .. | 3/3 | 4/– |

Per Ton.

24 gauge, £22/10/–. 26 gauge, £24/–/–.

### Ridging.

6ft. length—12in., 1/0½ ; 14in., 1/2 ; 16in., 1/4½ ; 18in. 1/6½.
Angles, 1/3 each. Heads, 2/– each. Brackets, 3/6 per doz. Spikes and Tubes, 9d. per doz.

### Spouting.

6ft. length—4in., 10½d. ; 4½in., 11¼d. ; 5in., 1/0½ ; 6in., 1/2.

### Downpipe.

6ft. length—2in., 8¾d. ; 2½in., 10½d. ; 3in., 11¾d.

### Tanks.

Galvanized Corrugated.

| | | | |
|---|---|---|---|
| 200 gallons .. .. .. | 30/– | 600 gallons .. .. | 65/– |
| 400 ,, .. .. .. | 47/6 | 800 ,, .. .. | 78/– |
| 1000 gallons .. | 91/– | | |

**BATHS.**—24g. Galvanized Plain Iron, 18/6. Shower, 2/6 extra.

### Chimneys.

4ft. x 2ft. 6in. x 22in., from 25/– 4ft. x 3ft. x 22in., from 30/–

## IRONMONGERY.

### Wire Nails (Col. manufacture).

4 to 7 g., 14/– ; 8 and 9g., 14/9 ; 10g. and 11, 15/9 ; 12g., 16/6 ; 13g., 17/3 ; 14g., 18/3 ; 15g., 19/6 ; 16g., 21/3 per cwt. cases.
1in., 1¼in., and 1½in., per lb., 2½d. ; 2in. and over, per lb. 2d.
Floor Brads, oval and cut, per lb. 2¼d.
Lead Heads, per lb., 3½d.
Spring Heads, 8d. per packet.
Galvanized Screws and Washers, 6d. per lb.
Galvanized Bolts and Nuts, ½ x ¼, 5/– per gross.

## LOCKS.

Vaughan's, 6in., 2/3. Carpenters', 6in., 3/9. American Rim Knob, 4in., 1/6. American Drawback, 3/6. Yale Latches, from 6/–. American Lock Sets, all designs, from 3/–.

**Sash** Fasts, 8d. each. Sash Lifts, 6d. per pair.
**Door** Knobs and Knockers, 2/– upwards.

### Hinges.

Butts and Screws, 2d. per inch. Tee and Screws, 1d. per inch.
Scotch Tees, 4d. per lb. Hook and Eye, 4½d. per lb.
American Gate, self-closing, 1/–.

### Ovens.

| | Inch. 24 | Inch. 30 | Inch. 36 |
|---|---|---|---|
| Colonial, from .. .. .. | 15/– | 17/6 | 20/– |
| Stoves, from .. .. .. | 50/– | 60/– | 80/– |

Ranges, from £4 each.

### Ventilators.

Galvanized Air-Bricks, 9 x 3, 6d.; 9 x 6, 9d.
Plaster ,, 9 x 3, 6d.; 9 x 6, 9d.

## PAINTS, OILS, COLORS.

### Paints.

White Lead, 35/6 per cwt. Red Lead, 4d. per lb.
**Oils.**—Raw Linseed, 3/5; Boiled Linseed, 3/7, in 5 gallon drums.

**Venetian Blinds,** all sizes, from 7½d. per super foot.

### Colors.

Umber, Burnt or Raw, 10d. per lb. Sienna, Burnt or Raw, 10d. per lb.
Driers, 5d. per lb. Turps, 5/– per gallon. Colors and stains of all kinds.
**Varnish.**—English, from 14/–; Colonial, 10/–.
**Hessian** or **Scrim.**—Rolls of 50 yards, 6d. yard.

### Glass.

16oz. sheet, cut to sizes, from 4d. per ft. 21oz. do. do., from 6d. per ft.
Muranese and all kinds of glass on hand.
**Paperhangings.**—Wallpapers and Borders, from 4d. a piece.

## KAURI.

### Turnery Sizes.

1½ x 1½, 19/–; 2 x 2, 19/–; 2¼ x 2¼, 2½ x 2½, 3 x 3, 20/–; 3½ x 3½, 4 x 4, 4½ x 4½, 22/–; 5 x 5, 6 x 6, 24/–.
3 x 1, 3rd quality, 18/–.

### Basalt,

Or *bluestone*, is the only building stone found near Melbourne although very durable, it is not used where a light appearance or architectural effect is required. It is well adapted for foundations, basements, heavy or sombre-looking buildings, kerbing and guttering; it is also sawn into flagging and landings, for which it is well suited on account of its great strength and durability. It is of volcanic or igneous origin, and forms some of the largest plains in Australia. A large quantity is exported to the adjoining colonies for steps, sills, paving, flagging, &c. For sawn bluestone, &c., see Index.

### Bricks, Terra Cotta, Etc.

**Bricks, &c.**—In consequence of the absence of good freestone in Melbourne, the manufacture of ornamental bricks is a fine art, and good brick architecture has resulted.

Cement Tiles, &c.—These are made by the Fancy Tile and Mosaic Floor Co. in South Melbourne. The tiles consist of marble and chip mosaic of beautiful and varied patterns. See Encaustic Tile Co.

*Architectural ornaments* such as diapers, pateræ, string courses, panels, keystones, architraves, &c., are made. The tiles are made from the finest Portland cement, and are pressed by hydraulic power, while the colours run through the tiles to about one-quarter their thickness. (For prices, &c., see Index.)

*Tesselated and Encaustic* tile pavements, gutter bricks, drain pipes, &c., are made at Mitcham, near Melbourne. The tiles are from 6s. 6d. to 16s. per super yard.

### Granites.

Grey and cream colour, from Beechworth. First-class award.

Sandhurst and Mount Alexander grey granite. The latter from Harcourt is the best. It is made into columns, polished, and exported. The Sandhurst granite obtained a first-class award at the Sydney and Victorian International Exhibitions in 1879.

Granite is also obtained from Mount Eliza, Mount Martha, Palenty Ranges, Mount Blackwood, Refuge Cove, Gabo Island, &c., the latter granite is probably the hardest and most durable.

### Cement (Portland).

*Mitchell's Emu Brand*, made at Richmond, near Melbourne. This Victorian cement stands a good test.

Terra Cotta.—There are good specimens of terra cotta work (buff and red), and roof tiles, made at Terra Cotta Works at Brunswick. W. H. Rocke &. Co

The *front* of the New Zealand Insurance Co.'s Buildings has been built on terra cotta from the above works. It has lately been used in the State Schools, some of the Government buildings, the English cathedral, &c. There are also two other terra cotta and pipe works at Brunswick.

*Terra Cotta Lumber* (hollow blocks) are also made at Brunswick, and are largely used in Melbourne, &c. (*See* Index.)

## Limestones.

*Limestones* suitable for building are found near Geelong ; the Waurn Ponds free limestone is the best yet discovered, and was introduced into Melbourne about 1877 from near the surface ; the quarry now being fully opened, the stone is found to be much harder, and was used to great advantage in building St. Paul's Cathedral, Melbourne ; it is much cheaper than the Oamaru free limestone, so much used in Melbourne.

*Lithographic Limestone* is also found at Geelong. It is very hard, of a dark drab, and will take a polish ; it is full of holes filled with composition, and is burned into lime at Geelong.

*Portland and Warnambool Limestones* are granulated and porous ; they are used for building-stone or burnt into lime.

## Lime.

*Lime* is made from the above limestones, also from limestone found at Bet Bet Creek, twenty miles from Sandhurst.

*Recent or Tertiary Limestone* is found throughout the north-western portions of the colony, between the settled districts and the Murray River on the north, extending into South Australia on the west. It is also found at Benalla and the Delegate River.

*On or near the coast* limestone is found at Belfast, Cape Otway, Western Port, Cape Patterson, Cape Liptrap, Lake Victoria, and Ninety-mile Beach.

*Hydraulic Lime*, the lithographic limestone, produces a lime, slightly hydraulic. The lime made at Limestone Creek, near Guildford, is also hydraulic. The Collingwood or Fitzroy limestone is highly so, containing 52 per cent. carbonate of lime ; 18 per cent. carbonate of magnesia ; 12 per cent. alumina ; and 18 per cent. hydraulic silica. This limestone is very limited in extent.

*The Hydraulic Lime Co.*, William-Street, Melbourne, have 3 large kilns at Coimadia, Bacchus Marsh The lime is said to be similar in appearance and properties to the noted Blue Lias lime.

*Septaria*, in the form of white and grey cement stones, are obtained at Spring Creek, 15 miles from Geelong. Mr. Selwyn, the late Government Geologist of Victoria, in his Report of July 1854, refers to a bed of stiff blue clay containing bands and septaria of hard grey argillaceous limestone, "nodules of precisely similar nature are extensively collected for the manufacture of cement from the London clay, the cliffs of Hampshire, the Isle of Sheppey, &c."

Much additional information on the subject may be obtained from the Victorian Government Prize Essay on Economical Manufactures. A copy will be found at the School of Arts, Sydney, and the Public Library, Melbourne. The geological maps of Victoria afford much practical information.

*Shell Lime* is made on most parts of the coast, but it is only fit for internal plastering ; it is about two-thirds the price of roche, or stone lime The shells might be crushed and used with clay for making cement

## Metals.

Rolled Iron and Lead Piping have been manufactured near Melbourne since 1862, and are fully equal to similar imported articles.

*M'Lean's Composite Columns*, patented in Melbourne, claim special attention on account of their efficiency, economy, and beauty when compared with the cast iron columns ; which they have almost superseded for verandahs and balconies. They consist of an outer casing of galvanized sheet iron, with a core in the form of an iron pipe, angle of T iron, the spaces being filled with cement and clean sharp sand as a concrete ; the capitals and bases are of cast zinc. They were introduced into Sydney about 1880 and are much liked and largely used.

## Sandstone.

*Sandstone*, suitable for building, is obtained from the various goldfields, but it is generally very hard, laminated, and often micaceous, and is therefore better adapted for flagging or flat-bedded rubble, A soft sandstone was obtained at Bacchus Marsh, and used for the Treasury in Melbourne ; also a similar sandstone from Darley, near Bacchus Marsh, which was used for the back facade of the Parliament Houses in Melbourne. Both these free sandstones are too soft and friable for permanent buildings.

*Stawell Free Sandstone* is obtained from the Grampian Hills, about eighteen miles from Stawell. The front of the Town Hall at Stawell is now found not to be a fair sample of this stone. It is a fine close-grained heavy sandstone, and apparently of a durable quality ; but its appearance in the above building is greatly marred by particles of ironstone thinly interspersed, which, when exposed to the weather, disintegrate or waste away, running down the face of the stone and staining it. This defect is greatly modified in the best of the stone now being obtained for the addition of a third storey to the General Post Office, Melbourne. The cost of working the Stawell sandstone is about 50 per cent. more than the Tasmanian freestone, although the difference in the whole cost of the additions is only about one-eighth more, or £10,532 extra.

*Barrabool Hill Free Sandstone* is found near Geelong, and has been largely used there, and in building St. Paul's Cathedral, Melbourne.

## Slate.

*Slate* is found in many parts of Victoria, but with the exception of the Castlemaine slate, it is scarcely known or appreciated.

*Castlemaine Slate* is coming into general use for flagging, steps and sills, landings, hearths, &c., and is now largely sent to Sydney for these purposes, it is equal, on the whole, to the Welsh slate.

Castlemaine grey slate, when used for hearths, is stronger, cheaper, neater, and more durable than the Sydney and Victorian freestones. It is said to be much stronger than Caithness flagging or sawn bluestones.

All the most useful and valuable Australian timbers abound in Victoria.

Blue Gum (*Eucalyptus globulus*).—Leaves scattered and same colour on both sides. It is of rapid growth, producing at the same time a most remarkable variety of leaves. The young leaves are of a bluish tinge, from which the tree derives its name ; bark near butt dark and rough, on stem light and smooth. It is a favourite tree for Reserves, Parks, etc., and is easily raised from seed, being much cultivated in Ceylon, South Europe, Melbourne, Algiers, America, &c. It thrives in all places, and converts fever-stricken swamps &c., into healthy localities. It is one of the largest known trees. There is a fallen tree at Dandenong 435 ft. long, from the root to the top.

Blackwood is a superior timber for joinery or carriages. It is little liable to warp or crack ; is often used for carved and cabinet work, and resembles walnut in grain and colour. It receives a brilliant polish, is almost free from pyroligneous acid, and is on that account considered the best wood for the handles of surgical instruments. Diam. 18 to 36 ins. and height from 40 to 100 feet. Specific gravity .620, when seasoned.

Blackbutt (*Euc. pilularis*).—Leaves scattered and paler on underside ; stamens all fertile ; branches angular. The bark is rough, blackish, and persistent or firm on butt, but smooth and whitish on upper part of trunk. It is found on the coast range. Height up to 300 feet, and diam. up to 14 feet near the butt. The timber is hard and strong, and is used for building scantlings, bridges, sleepers, &c. Spec. gravity, .990 ; crushing weight per square inch lengthwise, 8.449 lbs., and transverse, 8064 lbs. See Index for New South Wales Timber.

Bloodwood (*Euc. Corymbosa*).—Leaves scattered and pale on underside, the side veins being nearly square to mid vein ; stamens (of flowers) all fertile ; seed lobes large ; bark persistent, rough, and grey ; height up to 150 feet ; timber hard, durable and veiny. It is used for bridges, sleepers, &c. Sp. gr. .918.

**Box.** Yellow (*Euc. Mellisdoru*).—Leaves scattered and of a dull green colour ; the bark on trunk is brown outside, but of a bright yellow inside next trunk ; the trunk when stripped being also bright yellow ; height up to 250 feet, diam. up to 8 feet. The timber is tough, dense and durable, and superior even to Ironbark in actual strength. See Index and the Tables I have cast out from the Tabulated formulae.

Ironbark (*Euc. sideropholia*), is a dense, deep red, close-grained wood, and stands high as regards its elasticity and strength, as per table (see Index). It may be readily recognised in the forest by its blackish, deeply-serrated and ridged bark, which is impregnated with black gum. It is largely used for girders, sleepers, piles, and engineering works generally. It has been destroyed in a few years by sea worms in Sydney harbour, and on the Clarence and Macleay rivers in N.S. Wales, as stated by the late Captain Ferguson, of Victoria. It is the heaviest wood in general use, its specific gravity, just felled, being 1.420. Its strength (English oak being 1.00) is 1.55.

*Eucalyptus Leucoxylon*, is another kind of Ironbark ; leaves narrow, foliage scanty, bark hard, deeply furrowed and dark, but sometimes pale and smooth. It is generally found on the goldfields or upon auriferous ground.

*Euc. creba*, known in Queensland as the white, narrow-leaved Ironbark. These three varieties of Ironbark possess similar properties. Logs can be obtained 50 feet by 18 inches square ; the colour varies from a dark red to a light yellow ; the grain is straight, close, and rather greasy. For ship-building it is classed first at Lloyds'.

KARI, *Euc. diversicolor*.—Leaves scanty and paler on the underside, stamens all fertile, bark smooth and white. It is found on the coast range ; height up to 400 feet, diam. of trunk up to 20 feet, vying with the Blue Gum or king of forest trees, not only in size but also in hardiness and quickness of growth. The timber is light red, hard, dense, and tough, and is used for the same purposes as Blue Gum. Spec. gravity ·980. Tensile strength 7070 lbs. per square inch. Crushing weight per square inch lengthwise 12,513 lbs., according to Leslett the only authority on this subject. The timber is not so well known as the other Eucalyptii of commerce.

MESSMATE, *Euc. obliqua*.—This is one of the nine varieties of Stringy Bark and has similar properties. It was formerly much used for bridges by the Roads and Rivers Department of Victoria. It abounds in the Bullarook forest, near Ballarat, in great perfection, and is generally found associated with ordinary Stringy Bark. It attains the height of 300 feet.

PEPPERMINT GUM, *Euc. amygdalina* or the Almond-Leaved Gum, is another of the nine species of Stringy Bark. This and the Blue Gum are the largest trees in the world, the celebrated *Wellingtonia sequoia* of California not excepted. The Rev. Robert Collie, F.L.S., in his lectare on the Forest Trees of New South Wales, stated that in the deep gullies of the Dandenong Ranges, a tree was measured 480 feet in height, and some of these trees are reported to be 53 feet in circumference, or 17 feet in diameter. It is used for ship, bridge, and house building, shingles, fences, &c. The leaves yield the largest quantity of volatile oil, 500 oz. having been extracted from 1000 lbs. of leaves. This oil is used in the manufacture of varnish and scents.

RED GUM, *Eucalyptus Rostrata*.—Bark smooth and whitish; diameter up to 14 feet, and height up to 250 feet. Generally found on river banks and swamps It is very abundant on both banks of the Rivers Murray and Murrumbidgee. It is a valuable timber, having been largely used for railway sleepers, piles, girders, fencing, &c. Of a deep red colour, heavy, hard, and close, but short in grain, the trunks often break in falling ; it shrinks but little, and is very durable under ground or in water ; it is in the first-class for ship-building at Australian Lloyds', being A for 12 years,

Spotted Gum (*Euc. Goniscalyx*).—Foliage thin and of a dull green colour ; stamens all fertile ; height up to 300 feet, diam. of trunk up to 8 feet. The timber varies from pale yellow to brown, is hard, durable, free from veins, and little liable to warp. It is much used for sleepers, piles, dray poles, and general building purposes; also on account of its great tensile strength and toughness, for the turned poles (about 18ft. x 2¼in. diam.) used in the Canadian or pole system of artesian boring. Its specific gravity is .981. See Index as to strength, &c. It is well-known in N.S. Wales, and was largely used in the construction of the late International Exhibition in Sydney.

Stringy Bark (*Eucalyptus Maccorryncha*), grows to a great height and size in Victoria and Tasmania, 200 feet to the first limb being of common occurrence. It is largely used for market scantlings of building timber, and is one of the earliest and best known timbers. It readily splits into posts and rails, palings and shingles, and is generally found on the goldfields, where it is also used for slabs for lining shafts, &c. Although occasionally used for girders or beams, it is inferior for this purpose to either blue gum or box. It has been exported from Tasmania to Victoria in large quantities, and in well-known scantlings, which have become general in Victoria, N. S. Wales and Queensland, for this and all other marketable hardwoods. Its specific gravity is 1.020 or 63½ lbs. per cubic ft. The leaves are of a dull green, foliage thin, the bark dark, deeply ridged, thick and stringy, and is much used in the bush for roofing huts and sheds, covering partitions, &c. The wood is hard and varies from a straw colour to a light brown. Like most of the marketable hardwood it shrinks at least 4 per cent. of its thickness or depth, and is frequently marred by large gum veins. It is readily attacked by white ants, especially if unseasoned. When used for wharves, &c., in sea water it succumbs to the attack of sea worms in about 8 years.

The strength of any scantling may be readily obtained by referring to the table in this book. (See Index.)

Woollybutt (*Euc. longifolia*).—Leaves long and dull green ; flower stalks long and slender ; stamens (of flowers) all fertile ; seed vessels large ; bark persistent (or fixed), rough, and grey ; height up to 150 feet. It is found on the coast side of Dividing Range ; timber durable and strong ; used for sleepers, drays, fences, &c. Spec. gravity 1.034 ; crushing weight, longthwise, 7997 lbs. ; transverse, 2968 lbs. per sq. inch.

Blue Gum, Spotted Gum, Stringy Bark and Woollybutt are found in N.S.W. and Queensland in large quantities.

The descriptions of Blue Gum, Spotted Gum, and other well-known timber trees, will be found under one or the other States' list of Building Materials.

## FREE SANDSTONE AT THE QUARRY.

| | s. | d. |
|---|---|---|
| Rough hearths, lintels, steps, or sills, per sup. ft. | 1 | 6 |
| Stone coping, per sup. ft., and rubble, per load .. 1s. 3d. to | 1 | 6 |
| Ashlar, 12in. x 8in., per lin. ft. | 1 | 1 |
| Headers for ashlar, each .. 3s. to | 4 | 6 |
| Quoins, each according to size .. 3s. to | 5 | 0 |
| Dimension stones, per cube from | 1 | 3 |
| Wrought stone hearths, steps, and sills, each from .. 10s. to | 22 | 0 |
| Slate hearths with rubbed face, per sup. ft. | 3 | 6 |
| Stone hobs, per pair .. 5s. to | 6 | 6 |

## BRICKS.

| | | | |
|---|---|---|---|
| Facing Bricks, per 1000 | 5 | 10 | 0 |
| Ordinary, at kilns | 1 | 18 | 0 |
| Stone lime, per bushel | 1 | 8 | |
| Cement, per cask | 13 | 0 | |
| Surface Drain tiles, in foot lengths, 12lb. each | 0 | 4½ | |
| Ditto. do. do. 16lb., each | 0 | 6 | |
| Flooring tiles, 12 x 6, per 100, 25 0 9 x 9, per 100 | 20 | 0 | |
| Horse-shoe tiles, No. 1, foot lengths, 7¼lbs. | 0 | 1½ | |
| No. 2 ,, 11lbs. | 0 | 2½ | |
| No. 3 ,, 12¼lbs. | 0 | 3½ | |
| 12″ and 18″ Cowls for chimney tops 1/- & | 1 | 6 | |

## Terra Cotta Chimney Pots.

| | Each. | | |
|---|---|---|---|
| No. 1, Diamond pattern, 64in. x 19in. | 30 | 0 | |
| No. 2, Dental ,, 38 x 15¼in. | 20 | 0 | |
| No. 3, Cable ,, 40in. x 15¼in. | 15 | 0 | |
| No. 4, Octagon ,, 30in. x 15in., 10 6 Plain | 6 | 0 | |

## SANITARY DRAIN PIPES.

### Glazed and Flanged.

| | Weighing about. | | Per ft. s. | d. |
|---|---|---|---|---|
| 3in. in 2ft. lengths | 10lbs. | each | 0 | 4 |
| 4in. ,, ,, | 14 | ,, | 0 | 5 |
| 6in. ,, ,, | 32 | ,, | 0 | 9 |
| 9in. ,, ,, | 64 | ,, | 1 | 3 |
| 12in. ,, ,, | 112 | ,, | 2 | 3 |
| 15in. ,, ,, | 148 | ,, | 3 | 3 |
| 18in. ,, ,, | 188 | ,, | 4 | 3 |
| 21in. ,, ,, | 218 | ,, | 6 | 3 |
| 24in. ,, ,, | 256 | ,, | 8 | 0 |

Junctions and bends charged as 3ft. of pipe.
Double junctions, Inspection pipes, and reducing pipes, as 4ft. of pipe.
Syphons, stock sizes, 4, 6, and 9in. diameter, per foot .. 1 0
Intercepting traps, with 4in. and 6in. connections, fitted with grating, &c., complete, at 7s. 6d., 15s., 21s., and 30s. each.

## TIMBER.

Subject to revision. These prices are for lengths up to 30ft. only.

### Pine.

| | Per 100 Sup. Feet. s. d. |
|---|---|
| Rough scantling, to 3in. wide and 2in. thick | 13 6 |
| Ditto, all sizes, over 3in. wide and up to 12in. | 15 0 |
| Ditto, all sizes over 12in. wide, and up to 18in. | 17 6 |
| Ditto, all sizes, over 18in. wide, and up to 24in. | 21 0 |
| Dressed, 6in. x $\frac{5}{8}$in. and 6in. x 1in. Flooring, ceiling, lining, partition boards, 8in. x 1in. chamfered boards | 17 6 |
| ,, 4in. x 1in. T. and G., T.G.B., and T.G. and V. Jointed | 20 0 |
| ,, Boards, up to 12in. | 17 6 |
| ,, ,, over 12in. and up to 18in. | 20 0 |

### Hardwood.

| | |
|---|---|
| Rough, all sizes up to 9in. x 9in. | 16 0 |
| ,, ,, over 9in. and up to 12in. | 17 6 |
| Over 12in. 1/– extra for every 1in. in width up to 15in. | |
| Dressed, all sizes, excepting 4in. x 1in. | 18 6 |
| ,, 4in. x 1in. | 19 6 |

Special lengths, 1/6 extra. Special kinds of Hardwood, 2/– extra.

### Beech.

| | |
|---|---|
| Rough, to 12in. wide | 22 6 |
| Dressed, to 6in. wide | 25 0 |

### Dressed Lattice.

| Size. | Pine. s. d. | Beech. s. d. | Cedar. s. d. |
|---|---|---|---|
| 1 x $\frac{1}{4}$ | 2 3 | 3 0 | 4 0 |
| $1\frac{1}{4}$ x $\frac{1}{4}$ | 2 6 | 3 3 | 4 6 |
| $1\frac{1}{2}$ x $\frac{1}{4}$ | 2 9 | 3 6 | 4 9 |
| $1\frac{1}{2}$ x $\frac{1}{2}$ | 2 10 | 3 10 | 5 0 |

### Pine Verandah Sweeps.

| Size. | Length. | Each. Rise 4in. s. d. | Rise 4in. s. d. |
|---|---|---|---|
| 4 x 2 | 6 feet | 2 0 | 2 4 |
| ,, | 6 ,, | 2 4 | 2 8 |
| ,, | 7 ,, | 2 8 | 3 0 |
| ,, | 8 ,, | 3 3 | 3 6 |
| ,, | 9 ,, | 3 6 | 3 11 |
| ,, | 10 ,, | 3 9 | 4 4 |
| ,, | 11 ,, | 4 4 | 4 8 |
| ,, | 12 ,, | 4 8 | 5 3 |

Or $3\frac{1}{2}$d. per super ft. for the timber the Sweep is taken out of.

### Sawn Hardwood Palings.

Per 100 Pieces.

| Length. | Square Square Top. s. d. | Diamond, or Gothic. s. d. | Diamond, Gothic and Bored. s. d. | Diamond Gothic, Side and Centre Bored. s. d. |
|---|---|---|---|---|
| 3 x $\frac{5}{8}$ 4′6″ .. | 7 0 | 10 0 | 12 6 | 14 0 |
| ,, 5′ .. | 7 6 | 10 6 | 13 0 | 14 6 |
| 3 x 1 4′6″ .. | 11 6 | 15 0 | 18 0 | 20 0 |
| ,, .. 5′ .. | 12 6 | 16 0 | 19 0 | 21 0 |

### Fret Panels.

Each.

| | Pine. s. d. | Cedar. s. d. |
|---|---|---|
| 2ft. 8in. x 1 ft.4in. .. .. .. .. | 4 0 | 5 0 |
| 2ft. 8in. x 1ft. 6in. .. .. .. .. | 4 6 | 5 8 |
| 2ft. 10in. x 1ft. 4in. .. .. .. .. | 4 6 | 5 8 |
| 2ft. 10in. x 1ft. 6in. .. .. .. .. | 4 9 | 6 0 |
| 3ft. x 1ft. 6in. .. .. .. .. .. | 5 0 | 6 6 |

### Fret Ceiling Ventilators.

With Moulded Ring.

| | Pine. s. d. | Cedar. s. d. | | Pine. s. d. | Cedar s. d. |
|---|---|---|---|---|---|
| 12in. dia. outside | 3 3 | 4 0 | 21in. dia. outside | 6 0 | 7 9 |
| 16in. ,, | ..4 0 | 5 0 | 22in. ,, | ..6 3 | 8 3 |
| 18in. ,, | ..4 6 | 6 0 | 24in. ,, | ..7 0 | 10 0 |
| 20in. ,, | ..5 9 | 7 6 | | | |

### TURNERY.

Stock Patterns only.

| | Size. | Lgth. | Pine. | H'wd. | Beech. | Cedar. |
|---|---|---|---|---|---|---|
| Turned Top Newel, each .. | 3 x 3 | 4′6″ | .. | 1/9 | .. | .. |
| Ditto, do. do. .. .. | 4 x 4 | 4′6″ | .. | 2/– | .. | .. |
| Newel Tops, each .. .. | 3 x 3 | .. | –/6 | –/7 | –/8 | –/10 |
| Ditto do. .. .. .. | 4 x 4 | .. | /8 | –/9 | –/10 | 1/2 |
| Ditto do. .. .. .. | 5 x 5 | .. | 1/– | 1/3 | 1/6 | 1/10 |
| Ditto do. .. .. .. | 6 x 6 | .. | 1/6 | 1/9 | 2/2 | 3/– |
| Ditto do. .. .. .. | 8 x 8 | .. | 3/– | 3/6 | 4/3 | 6/– |
| Finals, each .. .. .. | 3 x 3 | 3′6″ | 2/– | .. | 2/6 | 3/– |
| Ditto .. .. .. | 4 x 4 | 3′6″ | 2/4 | .. | 3/– | 4/– |
| Ditto .. .. .. | 4x 4 | 4′6″ | 2/9 | .. | 3/6 | 4/9 |
| Verandah Balusters, per 100 .. | 1 x 1 | 2′10″ | .. | 12/6 | 16/8 | .. |
| Gate Balusters, t'nd tops, each | 1 x 1 | 3′0″ | .. | –/4 | –/4½ | .. |
| Ditto do. .. .. .. | 1 x 1 | 5′0″ | .. | –/5 | –/5½ | .. |
| Ditto do. .. .. .. | 1¼ x 1¼ | 3′0″ | .. | –/5 | –/5½ | .. |
| Ditto do. .. .. .. | 1¼ x 1¼ | 5′0″ | .. | –/6 | –/6½ | .. |

## Mouldings.

Stock Patterns Only.

| Size. | Pine. s. d. | Beech. s. d. | Cedar. s. d. | |
|---|---|---|---|---|
| $\frac{7}{8}$ x $\frac{5}{8}$ .. | 4 6 | 5 0 | 7 0 | Stop Beads. |
| $1\frac{1}{4}$ x $\frac{5}{8}$ .. | 5 0 | 5 9 | 8 3 | |
| $1\frac{1}{2}$ x $\frac{5}{8}$ .. | 6 0 | 7 3 | 11 3 | |
| $2\frac{1}{2}$ x $\frac{5}{8}$ .. | 7 6 | 9 9 | 16 3 | |
| 1 x 1 .. | 5 0 | 5 9 | 8 3 | Scotias, Angle Bead, Staff Bead and Ridge Roll. |
| $1\frac{1}{4}$ x $1\frac{1}{4}$ .. | 6 0 | 7 3 | 11 3 | |
| $1\frac{3}{4}$ x $1\frac{3}{4}$ .. | 8 6 | 11 3 | 19 6 | |
| $1\frac{1}{2}$ x $1\frac{1}{2}$ .. | 7 3 | 9 3 | 15 0 | |
| 2 x $1\frac{1}{2}$ .. | 8 6 | 11 0 | 18 9 | |
| 2 x 2 .. | 12 0 | 15 6 | 25 6 | |

If Scotias are beaded, 1/6 per 100 ft. extra.

## Partition Rail, Saddle Cap, Cornice, Architraves, Skirtings.

Per foot lineal.

| | Size | Pine | Beech | Cedar |
|---|---|---|---|---|
| | 3 x 1 | 0 $1\frac{1}{4}$ | 0 $1\frac{1}{2}$ | 0 $2\frac{1}{2}$ |
| | 4 x 1 | 0 $1\frac{1}{2}$ | 0 2 | 0 $3\frac{1}{4}$ |
| Partition Rail .. .. | 4 x $1\frac{1}{2}$ | 0 $2\frac{1}{2}$ | 0 3 | 0 3 |
| ,, ,, .. .. | 5 x $1\frac{1}{2}$ | 0 3 | 0 $3\frac{1}{2}$ | 0 6 |
| Cornice or Architraves .. | 5 x 1 | 0 $2\frac{1}{2}$ | 0 3 | 0 $4\frac{1}{2}$ |
| ,, ,, .. | 5 x $1\frac{1}{2}$ | 0 4 | 0 5 | 0 $7\frac{1}{4}$ |
| ,, ,, .. | 6 x 1 | 0 3 | 0 $3\frac{1}{2}$ | 0 $5\frac{1}{2}$ |
| ,, ,, .. | 6 x $1\frac{1}{2}$ | 0 $4\frac{1}{2}$ | 0 $5\frac{1}{2}$ | 0 8 |

Per 100 feet lineal.

| | | | |
|---|---|---|---|
| Skirting .. .. .. | 6 x 1 | 15 6 | .. 36 6 |
| ,, .. .. .. | 8 x 1 | 19 0 | .. 47 0 |
| ,, .. .. .. | 9 x 1 | 20 10 | .. 52 0 |
| | 2 x 1 | 8 0 | 9 9 15 0 |
| | $2\frac{1}{2}$ x 1 | 8 9 | 11 0 17 6 |

## Cap Moulds, Handrails and Transoms.

Per foot lineal.

| Size. | Pine. | Beech. | Cedar. |
|---|---|---|---|
| 3 x 2 .. | 0 3 | 0 4 | 0 $5\frac{1}{2}$ |
| 3 x 3 .. | 0 4 | 0 5 | 0 $7\frac{1}{2}$ |
| 4 x 2 .. | 0 $3\frac{1}{2}$ | 0 $4\frac{1}{2}$ | 0 7 |
| 4 x $2\frac{1}{2}$ .. | 0 4 | 0 5 | 0 $7\frac{1}{2}$ |
| 4 x 3 .. | 0 5 | 0 6 | 0 10 |
| 5 x 3 .. | 0 6 | 0 8 | 1 0 |
| 6 x 3 .. | 0 7 | 0 $9\frac{1}{2}$ | 1 7 |

# PRICE LIST OF JOINERY—USUAL STOCK SIZES.

## DOORS—Double Moulded.

| Size. | Pine. 1½″ | Pine. 1¾″ | Pine. 2″ | Cedar. 1½″ | Cedar. 1¾″ | Cedar. 2″ |
|---|---|---|---|---|---|---|
| 6′6″ x 2′6″ .. | 13/6 | 14/– | 15/6 | 23/6 | 24/6 | — |
| 6′8″ x 2′8″ .. | 14/6 | 15/– | 16/6 | 24/6 | 25/6 | 27/– |
| 6′10″ x 2′10″ | 15/6 | 16/– | 17/6 | 25/6 | 27/– | 28/6 |
| 7″ x 3′ .. | 16/6 | 17/6 | 18/6 | 27/6 | 29/– | 30/6 |

## B.M. and S.M.

| | | | | | | |
|---|---|---|---|---|---|---|
| 6′6″ x 2′6″ .. | 17/6 | 19/– | 20/– | 27/6 | 28/6 | — |
| 6′8″ x 2′8″ .. | 18/6 | 19/6 | 21/– | 29/– | 30/– | 31/6 |
| 6′10″ x 2′10″ | 19/6 | 20/– | 22/– | 30/– | 31/6 | 33/– |
| 7″ x 3′ .. | 20/6 | 21/6 | 23/– | 32/– | 33/6 | 35/– |

Raised Panels extra—Pine, 3/6; Cedar, 4/6.

## S.M., half-glass, 4-light, 16oz.

| | | | | | | |
|---|---|---|---|---|---|---|
| 6′8″ x 2′8″ .. | 15/6 | 16/– | 17/6 | 25/6 | 26/6 | 28/– |
| 6′10″ x 2′10″ | 16/6 | 17/– | 18/6 | 26/6 | 28/– | 29/6 |
| 7′ x 3′ .. | 17/6 | 18/6 | 19/6 | 28/6 | 30/– | 31/6 |

Raised Moulds extra—Pine, 2/–, Cedar 3/–.

## DOORS.

S.M., Margin Light, Coloured Glass, and Star Corners.

| Size. | Pine. 1½″ | Pine. 1¾″ | Pine. 2″ | Cedar. 1½″ | Cedar. 1¾″ | Cedar. 2″ |
|---|---|---|---|---|---|---|
| 6′8″ x 2′8″ | 29/6 | 30/6 | 32/– | 39/– | 40/– | 41/6 |
| 6′10″ x 2′10″ | 30/6 | 31/6 | 33/– | 40/– | 41/– | 43/– |
| 7′ x 3′ .. | 32/– | 33/– | 34/6 | 42/– | 43/– | 44/6 |

Price per door. Raised moulds extra, Pine, 2/–; Cedar, 3/–. If with plain coloured corners, 3/6 less.

## French Lights.

S.M., 4-light, 16oz. glass.

| | | | | | | |
|---|---|---|---|---|---|---|
| 7′ x 3′ .. | 24/6 | 25/6 | 27/– | 31/6 | 32/6 | 34/6 |
| 7′ x 3′4″ .. | 25/6 | 26/6 | 28/– | 33/– | 34/– | 36/– |
| 7′ x 3′6″ .. | 27/6 | 28/6 | 30/– | 35/– | 36/– | 38/6 |

Price quoted is per pair. Raised moulds, extra, Pine, 2/–; Cedar, 3/–. Raised Panels, extra, Pine, 2/–; Cedar, 3/–.

## Cedar Sashes—16oz. glass.

| Size. | 1½″ 2 light. | 1½″ 4 light. | 1½″ 12 light. | 1¾″ 2 light. | 1¾″ 4 light. | 1¾″ 12 light. |
|---|---|---|---|---|---|---|
| 3′10″ x 2′4″ .. | 10/– | 9/– | 9/6 | 10/9 | 9/9 | 10/3 |
| 4′6″ x 2′10″ | 11/– | 10/– | 10/6 | 11/9 | 10/9 | 11/3 |
| 5′2″ x 2′10″ | 12/– | 11/– | 11/6 | 12/9 | 11/9 | 12/3 |
| 6′ x 3′ .. | 14/6 | 13/6 | 14/– | 15/– | 14/– | 14/6 |

Price quoted is per pair.

The Queensland Maple, also called silkwood or red beech, is a light coloured timber ; grows principally north of Townsville, 50 or 60 miles inland along the coast line, and is a very sound wood, available in large sizes. The tree grows up to 20 feet girt. It is the coming fancy wood of Queensland (1907), and is suitable for furniture, shop fittings, such as panels, rails, and general turnery. The Government are using it for railway and tram car interior and construction. Large orders are being executed in Victoria and N.S.W. Supplies and particulars can be furnished by H. C. Bell, Cedar Merchant, Market Wharf, Sydney.

## QUEENSLAND BUILDING MATERIALS.

Freestone.—*Sandstone and Fire-clay* will be found in all the Coal fields of Queensland, the dip is flat and never exceeds 30 degrees.

*Breakfast Creek* quarry, about 3½ miles from Brisbane, has supplied most of the stone used in Brisbane, and is the stone quoted in my price list. It is durable, fine grained, and of a suitable colour.

*Flagging and Slate*, will generally be found in all goldfields ; the dip is rarely less than 50 degrees, mostly nearly vertical.

The sandstone found near Brisbane and in the southern districts of Queensland belong to the coal measures, and have their prototypes in Sydney and suburbs. The cost of working them is also the same.

*Goodna*, on the Brisbane River, abounds in good sandstone quarries from which the sandstone for the Parliament House, Government House and Town Hall were obtained.

*Granthaim.*—Abundance of first-class sandstone is found varying in color from white to brown. It was used in the Government Printing Office, Brisbane, and is also largely used for grindstones.

*Helidon* abounds in good, hard and durable sandstone from which grindstones have been made. Pearson's quarries are here. The stone varies much in colour (white, brown and liver), the liver and brown coloured stone being very durable. The Custom House and National Bank, Brisbane, are built of this stone.

*Highfield* quarries, from which the stone was obtained for the Treasury Buildings, is a second-class stone, and will require coating with some waterproof liquid to preserve its face from decay. The reliable evidence by the Hon. A. C. Gregory, F.R.G.S., is conclusive on this point. As some of the stone is better than the bulk of it, it shows that the beds vary in quality. This is borne out by the great difference in the analysis of different samples of the stone analysed by different analysts.

*Ipswich Coal Measures.*—The coal measures also produce fine brick earth or shales from which the best bricks, tiles and terra cotta are made. The coal measures are also found at Maryborough, Rockhampton, Warwick, West Moreton and Brisbane.

*Murphy's Creek* quarries yield good stone, similar to that found near Goodna. The freight to Brisbane is about 9d. per cubic foot.

*Mogul*, 4 miles from Goona, abounds in sandstone, permoated with very fine black specks, which are scarcely perceptible and of no detriment to its appearance or durability. It can be obtained of any size up to 50 tons.

*Warwick* Railway Station and Town Hall are built with sandstone from Mount Storat quarry. The new Hospital is built of stone from the Sareb quarry. The Masonic Hall is built of stone from Bishop Tuffnell's quarries.

The above facts are obtained chiefly from the Government Report on the sandstone of the southern districts of Queensland, published in 1888.

Granite—*Gilbert Gold Fields*, red granite.

*Ravenswood* Gold Fields green granite.

Marbles or limestones hard enough to polish.

*Ravenswood*.—Statuary marble.

*Broken River*.—Tropical Queensland. Black fossil marble, also basalt or bluestone.

*Gladstone* variegated marble (marble font).

*Calliope River*, rose, black, white, yellow and other marbles.

*Rockhampton*, variegated marbles from quarry, Northumberland Group, also from Percy and other islands on the Queensland coast.

*Warwick*, black and white statuary marbles.

Porphyry.—This is a peculiar conglomerate of primitive rocks of all tints, pink predominating. It is used in Brisbane for the bases of buildings, kerbing, channelling, and metalling the streets, &c. The R. C. Church is wholly built of it; the Normal School also, with sandstone dressings to openings. It is much harder than the freestone, but not so hard or costly to work as the Melbourne bluestone. The principal quarry is at O'Connell-town, near Brisbane

Terra Cotta.—The manufacture of terra cotta is probably more developed in Brisbane than in any other Australian city. The Queensland National Bank in Brisbane is the finest terra cotta building I have seen in Australia, all its main features, columns, pilasters, cornices, pediment, &c., being highly finished with terra cotta, which, with the white brick walls, produces a fine effect.

## Building Timbers.

The following description of Queensland timbers used for building has been taken chiefly from the Queensland Catalogue of Exhibits at the Sydney International Exhibition. The wholesale local cost prices given are those of 1879, and the present retail prices at Brisbane are more than double the local prices See Index.

As there has been little change in wages in Queensland since 1879 the present prices must be similar. The timber trade of Queensland is immense. Irrespective of a very large home consumption, which it is impossible to estimate, there is a large export trade in cedar and pine logs—exceeding £60,000 per annum.

Beech (*Gmelina Macrophylla*)—Diam., 24 to 42 in. ; height, 10 to 120 feet, found in scrubs bordering the rivers on the coast. A very useful timber, strong and durable, and easily worked ; it does not expand by damp or contract by dry weather ; much prized for the decks of vessels and the flooring of verandahs ; found in the north.

Queensland Beech (*Gmellina Leichhardtii*) found in the south and used for general carpentry.

Blackbutt (*Eucalyptus pilularis*).—Diam., 48 to 96 inches ; height, 60 to 80 feet. A large tree, with dark-coloured, rough, and somewhat furrowed persistent bark ; *furnishes excellent timber for house carpentry* ; or any purpose where strength and durability are required. Market local value, 8s. per 100 feet wholesale. It is found in the South of Queensland.

Bloodwood (*Euc. corymbosa*).—Diam., 24 to 80 inches ; height, 50 to 60 feet. A fair-sized tree, with a persistent furred bark ; timber subject to gum veins, but very durable ; principally used for posts ; does not readily take fire or suffer much from white ants. Market local value from 7s. per 100 feet, wholesale. Found North and South.

Bloodwood, white (*Euc. trachyphloia*).—Used for general purposes. Found in the South.

Blue Gum (*Euc. botryoides*).—Diam., 30 to 50 inches ; height 70 to 100 feet. A lofty spreading tree, with a rough furrowed persistent bark. Of frequent occurrence both upon the coast and in the interior ; a valuable timber, hard, tough, and durable. It is the only timber used in Queensland for felloes of wheels, and is one of the finest timbers for ship-building. Market local value, 9s. per 100 feet, wholesale in 1879.

Box (*Tristania conferta*).—Diam., 35 to 50 in. ; height, 80 to 100 feet. A large spreading tree, with a smooth brown, deciduous bark and dense foliage ; very generally distributed on open forest ground. The timber is much prized for its strength and durability. Market local value, 9s. per hundred feet. Used in ship-building ; ribs of vessels from this tree have lasted unimpaired for thirty years or more.

Box *Yellow* (*Euc. hemiphloia*).—Diam., 20 to 40 inches ; height, 50 to 60 feet. A moderate-sized tree, producing an excellent timber, famous for its hardness, toughness, and durability. Market local value, 8s. per 100 feet.

Brigalow (*Acacia excelsa*—Diam., 20 to 30 in. ; height, 50 to 80 feet. It covers immense tracks of rich scrub ; the wood is hard close-grained, of a dark colour, and is used for building purposes, fencing, &c.

Coach-wood (*Ceratopetalum apetalum*)—Diam., 24 to 36 in. ; height, 70 to 90 feet. A beautiful tree, with long cylindrical stem. Wood soft light, tough, close-grained and of agreeable fragrance ; it is good for joinery, cabinet work and coach-building.

Cedar *(red) Cedrela Toona.*—Diam., 24 to 75 inches; height, 100 to 150 feet. This magnificent deciduous tree is found in scrubs along the coast, occasionally extending inland for a considerable distance It puts out large branches, the junctions of which, with the stem, furnish those beautifully curled pieces of which the choicest veeners are made. The timber is light, very durable, easily worked, and is largely employed in house joinery and furniture-making: in fact, wherever lightness and durability are required. It is an article of great commercial importance, and is largely exported to the other colonies.

Cedar *(pencil) Dysoxylon.*—Diam., 20 to 40 in.; height, 70 to 80 feet. A large-sized tree inhabiting the rich alluvial scrubs upon the banks of the rivers in the district of Moreton Bay and White Bay, also on the south coast and inland; timber of a rich colour, used for cabinet-making and window work. When fresh cut the timber has much the smell of a swedish turnip. The wholesale local cost price is about 7s. per 100 feet.

Cyprus Pine (*Frenela Endlicheri*).—Diam., 20 to 40 in.; height, 50 to 70 feet. This tree forms vast forests along the coasts, growing on barren sandy soils. The timber is an article of great importance; it is durable, fine-grained, fragrant, and capable of a high polish; it is used for piles of wharves and for sheathing punts and boats; it *resists the attacks of the cobra and white ants*, and the root is valued by cabinet-makers for veneering purposes. The market local value is about 10s. per hundred sup. feet wholesale.

Don (*Lagunaria Patersoni*)—Diam., 18 to 36 in.; height, 40 to 60 feet. Found on the alluvial river banks of the Don River, Port Denison; timber white, close-grained, easily worked, and used for building purposes.

Flooded Gum (*Euc. rostrata*).—Diam., 40 to 48 inches; height, 80 to 100 feet. A majestic tree inhabiting the rich alluvial flats upon the banks of the rivers, and in such localities has a pillar-like trunk clear of branches for three-fourths of its entire height. The timber is of high repute for strength and durability. The market local value is about 9s. per 100 sup. feet wholesale.

Grey Gum (*Euc. saligna*).—Diam., 24 to 40 inches; height, 60 to 90 feet. A tall tree with a smooth silver-grey shining bark, shedding in thick longitudinal strips. Of frequent occurrence on the forest ridges near the Brisbane River. It is in good repute for rails in fencing (as it does not readily take fire), and building purposes, being both strong and durable. Market local value, 8s. per 100 feet. Found in the South.

Gum (*citron scented*) *Euc. citriodora.*—Diam., 18 to 34 in.; height, 40 to 70 feet, with a smooth bark. The foliage emits a strong odour of citron when rubbed. Timber, hard, durable, and used for house carpentry.

*Euc. globulus*, the noted blue gum of N. S. Wales, Victoria, and Tasmania (one of the largest trees in the world) is conspicuous by its absence in Queensland.

Ironbark (*Euc. siderophloia*).—Diam. 20 to 40 in. ; height, 70 to 100 feet. A tall tree, with a hard, persistent, rough, and furred bark. It occupies many ridgy, stony, forest lands in East and West Moreton and Darling Downs districts, has the highest reputation for strength and durability, and is used for large beams in building stores for heavy goods ; it is also used for railway sleepers, and other purposes where great strength is required. Market value, 8s. per 100 feet, wholesale. It is quickly destroyed by sea worms.

Ironbark, Silver Leaved (*Euc. melanophloia*).—Diam. 18 to 24 in. ; height 60 to 70 feet. With a blackish, persistent deeply-furred bark, the foliage more or less glaucous or mealy white ; timber used for railway sleepers, fencing and other purposes. Market local value, 10s. per hundred feet, wholesale.

Ironbark, White (*Euc. creba*).—Diam. 20 to 36 in. ; height, 70 to 90 feet, with a hard, blackish, rough, persistent bark. The timber is tough, durable, and valuable for building purposes. Market local value, 9s. per 100 feet, wholesale.

Kauri Pine (*Damarra robusta*).—Diam. 36 to 72 in. ; height, 80 to 130 feet. This huge tree inhabits the alluvial banks on the rivers nearest the coast in the Wide Bay district ; also in the moist and sheltered valleys on Fraser's Island. It has a smooth-barked trunk, of a lead colour. The wood is fine-grained, free from knots, and easily worked. It is not plentiful. The bush price is about 7s. 6d. per hundred sup. feet, some trees yielding as much as 25,000 feet.

Leichhardt's Tree (*Sarcocephalus cordatus*).—Diam. 24 to 30 in. ; height, 40 to 60 feet. A handsome, beautiful, moderate-sized tree ; found on the alluvial banks of the Don River, Port Darwin, &c., &c. Its wood is soft, close-grained, takes a good polish, and is often used for building and other purposes.

Lignum Vitae (*Vitex lignum vitæ*).—Diam. 20 to 24 in. ; height, 50 to 70 feet. A tree of general occurrence in the moist low scrubs, bordering the coast. The timber is hard, close-grained, and of a blackish color ; used by cabinet-makers, &c.

Mahogany (*Euc. resiniferi*).—Diam. 20 to 30 in. ; height, 60 to 70 feet. A tall tree, with a rough, persistent bark on the trunk, but more or less deciduous on the branches. The timber is much prized for its strength and durability, and is used for piles, as it is said to resist the action of cobra. Market local value, 8s. per 100 feet, wholesale. Found on the South Coast.

Tea Tree, White (*Melaleuca leucadendron*), Linn.—Diam., 20 to 40 in. ; height, 40 to 80 feet. Timber hard, close-grained, excellent for posts in wet ground and piles for wharves, and is said to be imperishable underground.

Turpentine (*Euc. Stuartiana*).—Diam. 24 to 40 in. ; height, 60 to 90 feet. The bark of the branches is smooth and deciduous, that of the trunk rough, rigid, somewhat stringy, and hard ; it is of common occurrence, exceedingly durable underground, difficult to burn, and is used for sleepers and many other purposes. Market local value, from 9s. per 100 feet, wholesale.

Turpentine (*Syncarpia laurifolia*).—Diam. 40 to 96 in. ; height, 70 to 100 feet. A magnificent tree, with a rough persistent bark on the trunk, but more or less deciduous on the branches. Timber valuable for piles and posts of timber fences ; very durable underground, and said to resist the *terrado navalis* in salt water. Market local value, 8s. per 100 feet, wholesale. See N. S. Wales timbers.

Strength.—The following list shows the *transverse breaking strains of Queensland Timbers*, chiefly used in construction. They have been selected from a much larger number of experiments made during the building of the bridge at Maryborough, in which ironbark and spotted gum only were used.

See " Notes on the Strength of Queensland Timbers," by F. Brierley, C.E., Inspector-General of Roads, Queensland.

The weight was applied in the centre of samples, *one inch square, resting on supports twelve inches apart, ends free* :—

| | No. of Tests. | Breaking weight, lbs. |
|---|---|---|
| Ironbark, four kinds .. .. .. .. | 16 | 888 |
| Spotted Gum (*Euc. maculata*) .. .. | 5 | 1305 |
| Grey River Gum (*Euc. saligna*) .. .. | 4 | 983 |
| Australian Beech (*Gmellina*) .. .. | 2 | 442 |
| Turpentine (Fraser Island) .. .. .. | 1 | 1041 |
| Flooded, or Red Gum (*Euc. Rostrata*) .. | 6 | 785 |
| Red Cedar (*Cedrella toona*) .. .. .. | 2 | 443 |
| Kauri Pine (*Dammara robusta*) .. .. | 2 | 460 |
| Hoop Pine (*Auraucar*) .. .. .. | 4 | 568 |

The specimens tried were the best of their kind, moderately seasoned, having been cut a few months only.

*Discrepancies.*—Comparing the three sets of experiments on the breaking weight of timber, viz., the above in Queensland, and two in Sydney (see N.S.W. Building Timbers), it will be seen that great discrepancies exist. In the Queensland timbers, the 16 ironbark specimens

were evidently inferior compared to the others, while the specimens of spotted gum were exceptionally good. In the experiments at Sydney, by Mr. J. W. Dunlop, the ironbark specimens appear to be far above the average. Taking into account the well-known properties of ironbark and spotted gum, the experiments at the Sydney Mint are the most reliable, and from these I have compiled the Tables showing their relative strength. Even if all the samples experimented upon were taken from trees of the same age, grown in similar soil and climate, felled at the same season, taken from similar portions of the trunk, seasoned in the same manner and for the same time, the results might not be the same; because colonial timbers, called by the same name in the different colonies, are found not to be identical when compared by botanists; hence the botanical name and properties are the only reliable data in cases of identity.

*Strength of Timber.*—On a previous page I have given the result of the most reliable experiments hitherto tried upon the strength and elasticity of some of the Australian hardwoods. The pieces tried were well seasoned, picked specimens, $1\frac{3}{4}$ inches square, supported at each end with a clear bearing of 4 feet, the weight being applied in the centre, and with the following results :—

| | Breaking weight in lbs. | Weight in centre without injury in lbs. | Ultimate deflection in inches. |
|---|---|---|---|
| Box, mean of 4 experiments .. | 1092 | 658 | 0.90 |
| Ironbark ditto .. .. | 1022 | 742 | 1.31 |
| Spotted Gum ditto .. .. | 896 | 560 | 0.85 |
| Stringy Bark ditto .. .. | 812 | 560 | 1.20 |

The above experiments were made with the view of comparing the results obtained by Professor Barlow, at Woolwich Dockyards, as stated on a previous page, and were similarly conducted in every essential particular.

Willow, although indigenous to Europe, has been largely planted at the homesteads of the Australian pioneers or squatters, on the banks of rivers, water holes, &c. It is light, pliant, soft, tough, and does not splinter. It is not easily burnt, and is therefore fit for flooring, roofing, ladders, guard posts, and fenders of wharves, &c. It is also well adapted for furniture and cricket bats. Its weight is about the same as cedar, 30 to 35 lbs. per cube foot.

Note.—In these articles on the Building Timbers of Australia, I have omitted those trees generally less than 12in. in diam., and also those that have been used for cabinet work only, known as fancy woods. The latter comprise most of the Australian trees, many of which might be used for panels of joinery, inlaid work, or parquetry flooring.

ABSTRACT FROM MR. W. SOUTERS' GOVERNMENT REPORT
Giving the most useful Trees for Carpentry, Joinery, etc.

| COMMON NAME. | BOTANICAL NAME. | USE. |
|---|---|---|
| Stave wood ... .. | Tarrietia argyrod'ndron | General carpentry |
| ,, ,, .. ... | ,, trifoliata .. | ,, ,, |
| ,, ,, ... ... | ,, actinophylla | Tool handles |
| White beech ... ... | Elæocarpus Kirtonii .. | Furniture, etc. |
| ,, ,, ... ... | ,, Bancroftii .. | Masts and blocks |
| Quangdong ... ... | ,, grandis .. | General carpentry |
| Pencil cedar ... ... | Dysoxylon Mulleri .. | Cabinet and joinery |
| ,, ,, ... .. | ,, Frazeranium | ,, ,, |
| Emu apple ... ... | Owenia venosa .. | General carpentry |
| Red cedar ... ... | Cedrela Toona.. .. | Cabinet and joinery |
| Crows ash . ... | Flindersia australis .. | General carpentry |
| Common yellow wood | ,, Oxleyana .. | Coachbuilding, etc. |
| Spotted tree . . ... | ,, maculosa ... | ,, ,, |
| ,, ,, ... ... | ,, Bourjotiana | General Work |
| ,, ,, ... ... | ,, Strzeleckiana | ,, ,, |
| ,, ,, ... ... | ,, ,, Latifolia | ,, ,, |
| Native tamarinal .. | Diploglottis Cunning-hamii ... ... | ,, ,, |
| Native "Tuckeroo" | Cupania anacardiodes | Tool handles, etc. |
| Bean tree ... ... | Castanospermum aus-trale .. .. | Cabinet and turnery |
| Leguminous Ironbark | Erythrophlœum labou-cherii ... ... | Hardest wood in Aus-tralia |
| Brigalow ... ... | Acacia harpophylla .. | Carpentry |
| Ironbark wattle .. | ,, excelsa .. .. | General carpentry |
| A rosewood .. .. | ,, glaucescens ... | Cabinet, turnery, etc |
| Ringy rosewood .. | ,, ,, variety | ,, ,, .. |
| Black wattle .. .. | ,, Cunninghamii | ,, ,, ,, |
| Hickory wattle .. | ,, aulacocarpa | Cabinet work |
| Acacia cedar .. .. | Albizzia Toona .. | General carpentry |
| Scrub redwood .. | Weinmannia lachno-carpo .. .. | Tool handles, mallets, etc. |
| Red bottle brush .. | Callistemon lanceolatus | Ship and wheelrights |
| Apple tree ... ... | Angophora subvelutina | Wheelrights |
| ,, ,, ... ... | ,, intermedia | ,, |
| Gum-topped box ... | Eucalyptus hemiphloia | Building |
| Ironbark ... ... | ,, siderophloia | General purpose, gum |
| Narrow-leaved iron-bark ... ... | ,, creba ... | ,, ,, |
| Iron gum tree ... | ,, Raveretiana | Building and cabinet |
| Coolibar ... ... | ,, microtheca | ,, |
| Sw'mp mahog'ny gum | ,, robusta . | ,, |

| | | |
|---|---|---|
| Woollybutt ... ... | Eucalyptus botryoides | Heavy carpentry |
| Messmate ... ... | ,, dealbata ... | Underground work |
| Poplar gum ... ... | ,, platyphylla | Fencing, etc. |
| Gulf gum ... ... | ,, clavigera ... | General purposes |
| ,, ,, ... ... | ,, phœnicea ... | ,, ,, |
| Moreton Bay ash ... | ,, tessellaris ... | ,, ,, |
| Bloodwood .. ... | ,, corymbosa... | Piles, posts, etc. |
| White bloodwood ... | ,, trachyphloia | General purposes |
| Rough stringy bark... | ,, Baileyana ... | Tool handles, leaves oil |
| Spotted gum ... ... | ,, maculata ... | Wheels and carriages |
| Swamp mahogany ... | Tristania suaveolens ... | Piles and ground work |
| Brisbane box... ... | ,, conferta ... | Boats and wheels |
| Fraser's Island turpentine ... ... | Syncarpia Hillii ... | Building, etc. |
| Russell's mahogany... | Lysicarpus ternifolius | Railway sleepers, etc. |
| Langdon's hardwood | Backhousia, Bancroftii | General work |
| Water gum ... ... | Eugenia Ventenatti ... | Boat and tool handles |
| White apple ... ... | ,, grandis ... | Casks and carpentry |
| Scrub Cherry... ... | Eugenea myrtifolia ... | Tool handles |
| ,, ,, ... ... | Panax Murrayi ... | House carpentry |
| Beech ... ... ... | Gmelina macrophylla | General carpentry |
| Queensland beech ... | ,, Leichhardtii... | Carpentry |
| Native nutmeg ... | Myristica insipida ... | Carpentry and nuts |
| Queensland laurel ... | Cryptocarya australis | Carpentry |
| "Till" ... ... | Endiandra Sieberi ... | Tool handles |
| Cudgerie ... ... | Litsea Reticulata .. | House carpentry |
| Grease nut ... ... | Hernandia bivalvis ... | Carriage breaks, etc. |
| A silky oak ... ... | Orites excelsa... ... | General carpentry |
| A silky oak ... ... | Grevillea polystachya | Cabinet and coopering |
| Silky oak ... ... | ,, robusta ... | ,, |
| Beefwood ... ... | ,, striata ... | ,, |
| Honeysuckle ... ... | Banksia integrifolia ... | Cabinet and boats |
| Milky mangrove .. | Exœcaria Agallocha | General purposes |
| Scrub poison-tree .. | ,, Dallachyana | Axe and pick handles |
| Swamp oak ... ... | Casuarina glauca ... | Shingles and staves |
| A Swamp oak ... | ,, equisetifolia | General purposes |
| Forest oak ... ... | ,, torulosa ... | ,, ,, |
| Stringy bark pine ... | Callitris Parlatorei ... | General carpentry |
| Inland pine ... ... | ,, robusta ... | Piles, boats, etc. |
| Native "Brorogery" | ,, rhomboidea ... | ,, ,, |
| She-pine ... ... | Podocarpus elata ... | Boat building, etc. |
| Kauri pine ... ... | Agathis robusta ... | General carpentry |
| Hoop pine .. ... | Araucaria Cunninghamii ... ... | ,, ,, |
| Bunya pine ... ... | Araucaria Bidwillii ... | ,, ,, |

For the localities suitable to the growth of the above and other trees well adapted for Cabinet work, &c., I would refer to Mr. Souters' voluminus and exhaustive report.

Moreton Bay Ash (*Euc. tesselaris*).—Diam , 14 to 25 inches ; height, 30 to 60 feet Timber of a brownish colour, not hard but tough ; highly spoken of for building purposes. It is found North and South in the colony. Market local value, 8s. per 100 feet.

Moreton Bay Pine (*Araucaria*).—Diam , 30 to 60 in. ; height, 150 to 200 feet. This majestic tree is, without exception, the most ornamental and useful tree in Queensland. The timber is an article of great commercial importance, and is used extensively in this colony. The wood is strong and durable when kept dry, but soon decays when alternately damp and dry. When procured from the mountains of the interior it is fine-grained, and is susceptible of a high polish. The wholesale *local* price was 7s. per hundred sup. feet in 1879. Some trees yielding as much as 10,000 feet of saleable timber.

Peppermint or Turpentine Tree (*Euc. microcorys*).—Diam., 18 to 36 inches ; height, 60 to 80 feet. A tall tree, with a persistent furrowed fibrous bark, growing in the forest near the Brisbane River ; timber strong and durable, used by wheelwrights for naves, felloes, and spokes.

Red Gum (*Euc. terreticornis*).—Diam., 18 to 36 inches ; height, 60 to 90 feet Used in fencing, building, plough-beams, poles, and shafts of drays, and also in ship-building. Market local value, from 8s. per 100 feet wholesale. Found North and South.

She Oak, *River* (*Cas. glauca*).—Diam., 24 to 36 inches ; height, 70 to 90 feet. A robust tree of general occurrence on the borders of rivers and creeks. The timber is strong and tough, used for staves, shingles, &c.

Spotted Gum (*Euc. haemastoma*).— Diam., 24 to 28 inches ; height, 60 to 120 feet. A very large tree, with a smooth deciduous bark, leaving a spotted and variegated trunk ; considered a first-class timber for shipbuilding, and much used for wheelwright's work and other purposes. Market local value, 8s. per 100 feet, wholesale.

Spotted Gum (*Euc. maculata*).—Diam., 20 to 36 inches ; height, 60 to 80 feet. A lofty tree, with a smooth bark falling off in patches so as to give the trunk a spotted appearance. It is a very valuable timber, highly prized for many purposes on account of its strength and elasticity ; used for buggy shafts, cogs of wheels, etc. In bridge-building it is used for tie-beams, etc., and is found to have the highest constant strength of any of the Queensland timbers. Market local value, about 8s. per 100 feet, wholesale. It is found in the South.

Stringy Bark (*Euc. fibrosa*).—Diam., 18 to 36 inches ; height, 40 to 75 feet. Timber much prized for flooring boards and building generally, having considerable strength and durability. Market local value, 7s. per hundred feet, wholesale.

Swamp Oak (*Casuarina equisetifolia*).—Diam , 12 to 24 inches ; height, 50 to 70 feet. It grows in great abundance near salt-water marshes and inlets. The wood is coarse-grained, beautifully marked, and used for purposes where lightness and toughness are required.

# SOUTH AUSTRALIAN BUILDING MATERIALS.

*As exhibited at the Australian International Exhibitions, &c*

## Bricks.

Best compressed machine made, are produced at Blackwood, Bowden, &c., and delivered in Adelaide.

## Dolomite.

*Dolomite*, or magnesian limestone (just referred to), is a first-class building stone, and is found associated with the South Australian freestone, but the great cost of working it with edged tools will prevent its being used except as rubble. If dolomite contains over 5 per cent. of alumina, it makes an excellent hydraulic lime; the Collingwood (near Melbourne) dolomite contains 11 per cent. of alumnia It would be interesting to know the analysis of the South Australian dolomite for hydraulic lime If used as a building stone it could be delivered on board for exportation at 3s. 9d. per cubic foot.

## Granite,

*Red*, procured from Port Elliot or Victor Harbour is of excellent quality, but is little used on account of the great cost of working it. It was used for the small columns to the upper windows of the University.

## Gypsum.

In nodules and crystals is found in Yorktown and burnt into Plaster of Paris.

## Limestone,

*Tertiary*, is largely distributed over the colony in the form of a freestone, very much like the Oamaru freestone of New Zealand. Specimens were exhibited from North Adelaide, &c.

*Para Wurlie Limestone* is extensively found on the southern sea coast; *it is of a salmon tint*, and was dressed as a building stone in the Exhibition. Like the Oamaru freestone it is soft and is easily cut with a knife.

*Manoora, Tea-tree Gully, &c.*, yield abundance of freestone. Excellent blocks of even quality can be procured up to ten tons weight. This stone has been used for the University in many colours, white and buff, with rough sandstone basements. Its weight is about 138 lbs. per cube foot or 16¼ feet per ton.

*Freestone.*—This is another name given to those portions of the above limestones that are suitable for building, the waste stone being used for lime, which is sold in Adelaide at 1s. per bushel. There are extensive quarries south-east of the colony, at the Hanging Rocks, Mount Gambier district, &c. Mr. Pitman, of Adelaide, says there are strata covering hundreds of square miles, in places 90 feet thick

It has been well tested for 21 years at Port MacDonnell, and similar stone has been used for the Post-offices, Museum, and other buildings at Adelaide, &c. It was shown as 9-inch dressed cubes in the Sydney International Exhibition, and can be cleared from the port at 2s. 9d. per cubic foot. At the Gawler Plains it is found in nodules, and in this form is only fit for lime. There can be little doubt as to its identity with the Oamaru stone, which for the last seven years has been the favourite freestone for public buildings in Melbourne. It extends from the Gawler Plains to Mount Gambier, where it has been used in the construction of the Mount Gambier Hospital, in conjunction with a salmon-tinted dolomite, or magnesian limestone, which costs about three times as much to work as the freestone, and was therefore used as rubble (or hammer-dressed stone) to reduce the cost of construction; the building complete cost £14,000.

### Marble,

From Rapid Bay, &c., awarded first-class medal; also three marble mantelpieces, valued at £10, £15, and £25, of South Australian marbles.

*Kapunda Marble*, now being used for facing the new Parliament Houses, is obtainable at Adelaide. For prices see Index.

*White Marble*, from Macclesfield, Angaston, &c., was imported into Melbourne in 1857, and formed part of the structure called the Building Museum. The great cost of working this and other marbles would preclude them coming into general use, except for ashlaring cemeteries, monuments, mantels, slabs, &c.

### Slate.

Good roofing slates are obtained at the Willunga quarries, and samples were exhibited at the Sydney International Exhibition, of Duchess and Countess slates, the prices delivered at Port Adelaide and Sydney for Countess slates were £9 and for Duchess £12 per 1000.

*Slate slabs* of a good durable quality are found at Mintaro and delivered at the Mintaro railway station at prices varying from 6d. for ¾-inch slate to 1s. 6d. for 3-inch slabs, self-faced or in the rough. This slate obtained a first-class award at the Sydney International Exhibition. For prices see Index.

### Building Timbers.

The best forest trees of South Australia are similar to those already treated of, viz.:—

Red Gum (*Euc. rostrata*); Blackwood (*Euc. melanoxylon*); Stringy Bark (*Euc. obliqua*); White Gum (*Euc. sideropholia*); Blue Gum (*Euc. veminalis*); and others of less note, such as Malee, She-Oak, Black Oak, Sandal-wood, Mulga, &c.

## CEMENT.

*Maria Island Cement.*—In April, 1890, it was discovered that the cliffs of this island could be utilized for the manufacture of a superior Portland Cement. The *natural cement stone* forming the cliffs was analysed, and soon after a sample of the cement made from the stone was also analysed and afterwards tested as to its practical strength. The cliffs are from 200 to 1500 feet in height, and are well situated for the economical manufacture of the cement, having good anchorage, pier, and depth of water for the largest intercolonial vessels within half a mile of the works. Professor Kernot tested the cement which was finely ground, leaving a residue in a sieve of 2,500 meshes per square inch, of only 1 per cent. Its weight is from 104 to 125 lbs. per bushel in proportion to its looseness.

*Three briquettes* of pure cement were tested after 7 days setting and gave an average tenacity of 402 lbs. per square inch, while two others tested after 14 days gave an average of 470 lbs. per square inch.

## Bricks.

*Fire-clay, Fire-bricks,* &c., can be obtained from the coal measures of Tasmania, as at Seymour, &c.

*Bricks, Paving Tiles, and Terra Cotta* can also be obtained from the pottery clays of the coal measures and the silurian clays of the goldfields.

Freestone (Sandstone), near Hobart. Good specimens from Tea-Tree Quarry, 21 miles from Hobart; also from Lindisfern; all being similar to the Point *Bentenet* and *Spring Bay sandstone,* used in Melbourne for years; the trophy of freestone from Knocklofty was of a brown tinge. These exhibits received a first-class award; there were also specimens from Mona Vale of similar freestone. The *Spring Bay sandstone* also received a first-class award at the Victorian International Exhibition.

Granite from the north-east coast of Tasmania.

Limestone and Marble from near Beaconsfield and the River Tamar; also from near New Norfolk.

A large portion of the lime made near Hobart and the Don River is more or less *hydraulic,* and is therefore well adapted for concrete and for mortar in all exposed situations. It was much used in Melbourne about 30 years ago. As it is liable to fire when slacking, it cannot be exported as quick or fresh lime, but it would probably answer to export the limestone to Sydney, where coals are cheap, and burn it there.

Slate.—Roofing slates are obtained from Back Creek and Piper River, but are not good enough for common use.

Blackwood, one of the finest Cabinet woods in Tasmania, also used for wheels, casks, carriages, and railway trucks; colour of a light walnut; maximum height, 130 feet, and diam. 4 to 6 feet.

Blue Gum, *Eucalyptus globulus*, so named by Labillardiere, who discovered it in Tasmania, in 1792; although found in N. S. Wales and Victoria, it is commonly known as the blue gum tree of Tasmania It is one of the largest trees in the world, having been known to attain a diam. of 30 feet, while other trees are mentioned 400 feet high, from actual measurement. It grows so fast that in ten years it attains the size of an English oak 100 years old. It is a beautiful tree, and is a great favorite in the Government reserves; the leaves when young are of a bluish green and nearly round; they afterwards become long and narrow, of a sea-green colour and very fragrant, producing small white fragrant flowers. The wood when mature is hard, dense, and durable, and is used for ship-building, wharves, jetties, quays, and for general building purposes, sleepers, &c. See Index for Blue Gum.

*Eucalyptus piperita* is another description of blue gum largely used for ship-building.

Celery Top Pine grows as large as the Myrtle. It is straight-grained, and makes good flooring boards, as it does not shrink much.

He Oak, or Swamp Oak.—Coarse-grained, light, and tough, and beautifully marked.

Huon Pine, like bird's-eye maple, used for panels of doors, &c., and for cabinet work. It is found at Port Macquarie, Port Davy, Pieman River, and on the western coast generally.

King William *or Forth Pine*, up to 12ft. girt, is found at the head of the Forth River; it is floated down by floods and loaded into vessels for any port. There were fine specimens at the Launceston and Melbourne Exhibitions.

Ironbark.—One of the best, strongest, and heaviest timbers; it is used largely for girders, story posts, sleepers, ship-building, &c.

Myrtle, *or Tasmanian Beech*.—Colour yellowish pink, highly ornamental cabinet wood; max. height, 200 feet, and diam. 12 feet. It is used for flooring boards, carpentry and ship-building, and is said to resist the *cobra*.

Peppermint (*Eucalyptus amygdalina*),—This is a superior wood for piles, and is said to resist the attacks of the cobra. This and the Blue Gum are the largest trees in the world.

Red or Pencil Pine, from near the source of the River Forth. It is abundant but almost inaccessible.

Red Gum or Mahogany, *Eucalyptus resiniferi*, used for ships, railways, and other engineering works and turnery. Diam. 30 inches, and height 70 feet. See Index for Red or Flooded Gum.

Silver Wattle found on mountain slopes, height up to 100 feet, and 3 feet diam. It is used for staves of casks, &c.

Sassafras (*Atherospounum moschatum*).—Bright yellow and used for panels.

She Oak, or *River Oak*, found on the banks of rivers, &c. It is strong and tough, and used for staves of casks, shingles, &c.

Stringy Bark, sawn from a split slab, over ten years in use, sound and hard. This is one of the largest trees of Tasmania; maximum height 300 feet, and diam. at 4 feet from ground, at least 20 feet. It is of a reddish yellow, and is in general use for building. When used for piles, &c., in sea water it is destroyed in about 8 years by sea worms.

White Gum (*Eucalypta resiniferi*), a straw-coloured wood, used in Tasmania for scaffolding, &c., Max. height, 150 feet; diam., 7 feet. Specimen four years old.

## BUILDING MATERIALS OF NEW ZEALAND.

Oamaru Free Limestone.—This excellent stone was thus referred to by W. Blair, Chief Engineer of Public Works at Otago :—The Oamaru Stone is a white granular limestone. According to the Government Analyst, its chemical constituents are as follows :—Carbonate of lime, 90.15; Alumina, 1.55; Oxide of iron, .55; Soluble silica, .45; Insoluble matter, 7.15; Loss, .15 = 100.00. This places it in the same class as the *Oolites of England and Caen stone of France*. It has a remarkable uniformity of colour and texture, and can be obtained in large blocks. Like all limestones of this kind, it is quite soft when quarried, but hardens rapidly on exposure to a dry atmosphere. This enables it to be worked into most elaborate ornamentation at little cost.

The stone is rather porous for use in a damp situation, but it answers well in ordinary walls and columns in a moderately dry climate, and it is unexcelled for internal decorations.

The durability of the Oamaru stone has not yet been thoroughly tested; its resistance to the disintegrating action of sulphate of soda is comparatively feeble. This really valuable stone was largely exhibited at the Sydney and Melbourne Exhibitions, and has been already extensively used in Melbourne. It obtained a first-class medal at the Sydney and Victorian Exhibitions. The Bank of Australasia and Imperial Insurance Offices, in Melbourne, are built with this stone; also ornamented stone steeple and church, Bondi, Sydney, 1880 to 1907.

Trachyte is a fine grey stone, found at Port Chalmers, and has been used in the construction of the Graving Dock there, and for the street kerbing of Dunedin and Port Chalmers. It is said not to cost so much as Bluestone to work. The Trachyte of New South Wales *costs more* to work than Bluestone. The two Trachytes mentioned are similar in colour, viz., a light bluish gray. It resists the action of fire and is used for building lime kilns in Otago.

KAURI (*Dammara Australis*) (Lambert).—The Kauri is the finest forest tree in New Zealand, and attains a height of 120 to 160 feet. The trunk is sometimes 80 to 100 feet high before branching, and attains a diameter at the base of 10 to 20 feet.

The timber is in high repute for masts and spars, deck and other planking of vessels, and is largely used for flooring and joinery throughout the States of Australia. There is abundant evidence of its durability for more than 50 years in some of the old mission buildings at the Bay of Islands. On the Thames goldfields is it used for mine props, struts, and cap pieces. *It forms the bulk of the timber exported from New Zealand.*

The variety known as Mottled Kauri is largely used for panelling.

Kauri pine is stronger as a beam than any other known pine, but unlike them it skrinks lengthwise when unseasoned. It occurs only in the North Island, and north of Mercury Bay, and grows best near the sea, on wet clay land.

The turpentine of this tree forms the celebrated Kauri gum, which is extensively excavated from the sides of old forests as far south as Taranaki. Kauri was used in the construction of the Queen's Wharf, Auckland, and after 23 years, the sea worms had eaten only the sapwood of the young timber.

*A large ornamental door frame*, about 6ft. wide and 12ft. high for the main entrance of one of the principal buildings in Sydney, was made of Kauri pine in 1887, because this timber possesses the combined qualities of the best hardwood and cedar. It withstood the ordeal of a summer in a galvanized iron workshop, and retained its shape and appearance, and is now as perfect as any large door frame could be.

The Exhibitions, and Government reports, &c., have thrown a flood of light on *the qualities of Kauri timber, which has been proved to be one of the best timbers in the world.* The rolling stock carriages and waggons of the New Zealand and N.S.W. Railways had been almost wholly constructed of Australian woods, *Kauri pine* being used for the sides, ends, and floors, in place of Baltic deal, which it had long superseded, it being much *harder and entirely free from knots, and is undoubtedly the best of all soft woods.*

## SUMMARY OF TIMBERS.

Report of T. Nesbitt, Town Clerk, Sydney, New South Wales, under date 12th December, 1904 :—

In reply to your letter of the 2nd instant, I have the honour to inform you that the City Surveyor advises that the following timbers are now used for wood paving in city streets :—

Blue Gum (*E. saligna*) ; Grey Gum (*E. propinqua*) ; Mahogany (*E. resinifera*) : Tallow-wood (*E. microcorys*) ; Blackbutt (*E. pilularis*) ; Box (*E. hemiphloia*).

The life of a close-jointed wood pavement is from fifteen (15) to twenty (20) years, depending upon the traffic, proximity to tramways, and climatic influences.

Report, City Engineer, Lincoln, England, Mar. 7, 1904 :—

Red Mahogany and Spotted Gum blocks are perfectly sound ; Blackbutt blocks show a little decay on bottom end, extending upwards about ¼ of an inch ; otherwise I consider the latter a good wood for paving streets.

## COMPARISON AUSTRALIAN AND OTHER TIMBERS.

*The superior strength of Australian hardwoods*, as compared to Deal and American Pine, generally used for scantlings of floors, roofs, &c., in Great Britain and in Melbourne, has induced some of the Sydney architects to use much lighter scantlings and greater spaces than those given by Tredgold, Barlow, or Gwilt. This change was brought about mainly by the experiments made by Messrs. P. N. Russell and Co., in Sydney, in May, 1860, which are subjoined. The specimens were $1\frac{1}{4}$ inch deep, tapered at sides, the *sectional area being one square inch, the pieces experimented on were supported on hardwood bearers twelve inches apart.*

The experiments were conducted by Mr. J. W. Dunlop, in the presence of a number of gentlemen skilled or interested in such matters.

| | Breaking weight, lbs. |
|---|---|
| Ironbark, average of 5 specimens .. .. .. .. | 1210 |
| Blackbutt ,, 4 specimens .. .. .. .. | 857 |
| Blue Gum ,, 2 specimens .. .. .. .. | 759 |
| Kauri Pine, New Zealand, 2 specimens .. .. .. .. | 542 |
| Oregon Pine, average of 2 specimens .. .. .. .. | 722 |
| Cedar, New South Wales, 2 specimens .. .. .. .. | 416 |
| American White Pine, average of 2 specimens .. .. .. | 416 |

More recent information may be obtained on the strength of Australian timbers from Professor Warren's tests made in July, 1889, at the Sydney University.

**Wood Paving.**—The relative suitability of the following Timbers for wood paving will throw considerable light on their nature and properties. The blocks were 6 inches deep, 3 inches wide, and 12 inches long. They had withstood the very heavy traffic of the busiest part of King-street, Sydney, for 14 months, and when examined and reported upon by the City Surveyor, in March, 1882, were in excellent order and condition. The measurement of the loss in depth by abrasion was in all cases taken where most worn

| Amount of wear in 14 months :— | Inch. |
|---|---|
| Red Gum, N.S.W. ; Blackbutt and Blue Gum, N.S.W., each .. | 1-16 |
| Ash and Box, N.S.Wales growth .. .. .. .. .. | 1-8 |
| Brown Pine, N. S. Wales .. .. .. .. .. .. | 3-16 |
| Cedar, N. S. Wales .. .. .. .. .. .. | 1-4 |
| Baltic, European .. .. .. .. .. .. | 3-8 |

The above trial clearly proves the economy and suitability of the Australian hardwoods for wood paving, the greatest amount of wear is scarcely appreciable. The superior character of the wood combined with the channel left between the blocks, as a foothold for the horses, are the main features in this highly successful wood paying.

Waste.—There is a reckless waste of timber going on throughout the colony from unnecessary falling, barking, and ringbarking ; also from bush fires, caused by carelessness. Most of the trees take from 50 to 100 years to come to perfection, and yet the forest reserves are only 1.89 per cent. of the area of the colony.

# BUILDING BY-LAWS, REGULATIONS AND ACTS.

## AMENDED CORPORATION ACT, 1900, Nos. 30 & 41. REGULATIONS *re* HOARDINGS FOR BUILDING PURPOSES.

That the enclosure consist of a fence not less than six (6) feet in height, and to be provided at suitable intervals with uprights 5 in. x 3in. and seven (7) feet high, tenoned into sole-plates 6 in. x 3in., also a similar row of uprights 5 in. x 3 in., and nine (9) feet high, to be erected along line of kerb, and tenoned into sole-plaltes 6 in. x 3 in., on which are to be secured plates 5 in. x 3 in., and supports 4 in. x 3 in., to carry sawn planks not less than two (2) inches in thickness, laid close, and covered with galvanised iron, and to be properly drained to the water channel.

The passage thus formed (unless the footway is in good condition, when it must be swept twice daily and kept clear of debris, etc.), must be floored with boards two (2) inches in thickness, laid smooth and true, and furnished with a guard rail 4 in. x 3 in., and four (4) feet from the ground to preserve a well-protected footway for passengers from danger of passing vehicles or building operations. Material must not be deposited or stacked upon the roof.

Such enclosure to be white-washed, and kept white-washed, and free from advertisements; whiting to have a mixture of size to prevent whitewash being taken off by brushing.

Lamps are also to be affixed to front of enclosure, and to be kept burning brightly from sunset to sunrise.

When the whole width of footway is occupied, a four-feet passage must be formed outside kerb line, the same to be floored with two (2) inch boards laid smooth and true, and furnished with stout guard rail four feet from the ground, and the whole covered in with two (2) inch sawn planks laid close, and covered with galvanised iron, leaving a clear headway of seven feet. The size of the uprights, sole-plates, and supports to be as previously specified. Care must be taken that the water-channel is not obstructed in any way, and must be kept clean and free from debris, etc.

Neither kerb nor gutter stones to be cut or injured in any way.

During the time that cellar or other excavations are being made, the streets over which the excavated materials are being hauled shall be cleansed at least three times each week for a distance of one hundred yards in every lead (in the central city) from the place of excavation or loading, and the expense for this extra cleaning shall be charged to the person or persons making the excavation, and to whom the license is issued.

The haulage to be along such streets as may be specified by the City Surveyor.

It is to be distinctly understood that the licensee will be held responsible for any damage or accidents that may occur on account of the road or footway being so occupied; further, he will be

required to re-instate any portion of the footway, etc., that may be disturbed or injured by his operations, remove all superfluous material, and leave the place in good order and condition to the entire satisfaction of the City Surveyor.

BY-LAWS *re* DEMOLITION OF BUILDINGS, CITY OF SYDNEY.

The Municipal Council of Sydney, in pursuance of its powers under the "Sydney Corporation Act, 1902," hereby makes the following By-laws:—

547. Any person taking down or demolishing, or causing to be taken down or demolished, any building or portion of any building in the City of Sydney, situated within 20 feet of any public way in the said City, shall, previously thereto, cause the windows and other openings in the external walls to be close boarded or otherwise covered, so as to minimise as far as practicable the nuisance arising from the escape of dust during such taking down or demolition.

548. Any person taking down or demolishing, or causing to be taken down or demolished, any such building or portion thereof, shall cause to be used canvas, screens of wood, mats, or other appliances thereon, in such a manner as to minimise as far as practicable the nuisance arising from the escape of dust during such taking down or demolition.

549. Any person taking or demolishing, or causing to be taken down or demolished, any such building or portion thereof, shall use or cause to be used water thereon, in such a manner so as to minimise as far as practicable the nuisance arising from the escape of dust during such taking down or demolition.

550. No person taking down or demolishing, or causing to be taken down or demolished, any such building or portion thereof, shall shoot, throw, or let fall from floor to floor into any basement of such building, any rubbish, bricks, lime, stone, mortar, or pieces of iron or timber so as to cause dust to escape from such building to the annoyance or inconvenience of persons using such public way.

551. In the construction of these By-laws the word "Person" shall include bodies politic or corporate, as well as individuals, and the singular shall include the plural, and the plural the singular, except where otherwise expressly provided, or unless the context otherwise indicates.

552. Any person offending against any of the above By-laws shall for each offence, upon conviction, forfeit and pay a penalty or sum not exceeding ten pounds.

Made by the Municipal Council of Sydney, this twenty-third day of February, 1904.

(L.S.) SAML. E. LEES,
Lord Mayor.

Thomas H. Nesbitt,
Town Clerk.

## REGULATIONS *re* HOARDINGS FOR PULLING DOWN OLD BUILDINGS, ALTERATIONS AND ADDITIONS, EXCAVATIONS FOR FOUNDATIONS, ETC.

Adopted by The Municipal Council of Sydney, 24th June, 1902.

The enclosure to consist of a fence not less than six (6) feet in height, and to be provided at suitable intervals with uprights 5 in. x 3 in. and seven (7) feet in height, tenoned into sole-plates 6 in. x 3 in.; also a similar row of uprights 5 in. x 3 in. and nine (9) feet in height, to be erected along the line of kerb, and tenoned into sole-plate 6 in. x 3 in., on which are to be secured plates 5 in. x 3in., and supports 4 in. x 3 in. to carry sawn planks not less than 2 inches in thickness, laid close and covered with galvanised iron, the same to be properly drained to the gutter.

The passage thus formed (unless the footway is in good condition, when it must be swept twice daily) must be floored with boards laid smooth and true, and furnished with a guard rail 4 in. x 3 in., and four feet from the ground, to preserve a well-protected footway for passengers from danger of passing vehicles or building operations.

Such enclosure to be white-washed and kept white-washed and free from advertisements; the whiting to have a mixture of size to prevent white-wash being taken off by brushing.

Lamps are also to be affixed to the front of enclosure, to be kept burning brightly from sunset to sunrise.

When the whole of the footway is occupied, a four-feet passage must be formed outside kerb, the same to be floored with boards laid smooth and true, and furnished with stout guard rails four feet from ground, and the whole covered in with two (2) inch sawn planks, laid close and covered with galvanised iron, having a clear headway of seven feet. The water channel must not be obstructed, and same must be kept clean and free from debris, etc.

Neither kerb nor gutter stones to be cut or damaged in any way.

Before commencing to pull down building, tarpaulins must be affixed to the front of same, and if necessary to be well sprayed with water, to prevent nuisance by dust.

During the time that cellar or other excavations are being made, the streets over which the excavated materials are being hauled shall be cleansed at least three times each week for a distance of one hundred yards on every lead (in the central city) from the place of excavation or loading, and the expense for this extra cleaning shall be charged to the person or persons making the excavation, and to whom the license is issued.

The haulage to be along such streets as may be specified by the City Surveyor.

It is to be distinctly understood that the licensee will be held responsible for any damage or accident that may occur on account of the road or footway being so occupied; further, he will be required to reinstate any portion of the footway that may be damaged or disturbed by his operations, remove all superfluous materials, and leave the street in good order and condition, to the entire satisfaction of the City Surveyor.

"SCAFFOLDING AND LIFTS ACT, 1902."

Proclamation annulling, amending, and adding Regulations to Schedule I. of the Act and Proclamations published in the "Gazette" of 14th August, 1903, and 19th April, 1904.

PROCLAMATION.

New South Wales to wit.

By His Excellency Sir Harry Holdsworth Rawson, Admiral in the Royal Navy, Knight Commander of the Most Honourable Order of the Bath, Governor of the State of New South Wales and its Dependencies, in the Commonwealth of Australia.

HARRY H. RAWSON,

(L.S.) Governor.

Whereas the Governor acting in pursuance of the power conferred upon him by section 7 of the "Scaffolding and Lifts Act, 1902," by a Proclamation published in the "Gazette" of the 14th August, 1903, annulled the Regulations contained in Schedule II. of the said Act, and added certain other Regulations in their place: And whereas by a Proclamation published in the "Gazette" of the 19th April, 1904, the Regulations numbered seven and nineteen of the last-mentioned Regulations were annulled and certain other Regulations were added or substituted in their place: And whereas it is expedient that such Regulations and the Regulations contained in Schedule I. of the said Act should now be annulled and Regulations made, added, or substituted, in lieu thereof: Now, therefore, I, Sir Harry Holdsworth Rawson, the Governor aforesaid, with the advice of the Executive Council of the said State, in pursuance of the above-mentioned power do hereby proclaim the following Regulations:—

1. The regulations contained in Schedule I. of the "Scaffolding and Lifts Act, 1902," and the Regulations published in the "Gazette" of the 14th day of August, 1903, No. 421, pages 5965-6, to be read and construed as the Regulations contained in Schedule II. of the said Act, and the Regulations published in the "Gazette" of the 19th day of April, 1904, are hereby annulled, but such annulment shall not of itself prejudice or affect any proceeding, matter, or thing lawfully done or commenced to be done under the authority of the said Regulations hereby annulled, and any direction, order or appeal or other proceeding pending on the date of publication hereof in the "Gazette" shall, until the confirmation, approval, granting, disallowance, refusal, or other final disposal thereof, be dealt with in manner required by such annulled Regulations unless the Regulations hereunder shall be applicable thereto.

2. The following Regulations are made, added, or substituted in the place and stead of the said annulled Regulations of Schedule I. of the said Act, and are to be read and construed as the Regulations contained in such Schedule I., that is to say:—

## REGULATIONS.

### Swinging Stage.

To bear three times the maximum weight required.

Blocks to be of iron or wood not less than 4 inches in diameter of sheaf, consisting of double and single block; all rope to be Manilla, not less than 2¾ inches circumference.

Platform to consist of 10-inch by 1½-inch planking running full length of stage, on 2 inches by ½-inch or 1-inch diameter wrought iron hangers, carried round stage with loop on top to receive tackle, each hanger bolted to planking with ⅜-inch bolts.

Platform to be not less than two planks in width, and shall be stiffened with strong cleat between the hangers. Each swinging stage 18 feet in length shall have two hangers, the distance between the hangers to be not more than 12 feet. Where the stage exceeds 18 feet in length, the planking shall be stiffened with a truss underneath, and other parts to be of stronger construction, as may be defined by the Inspector.

Guard rail to be of 3-inch Manilla rope, 1-inch pipe, or 3-inch by 2-inch timber securely fastened to hangers not less than 2 feet 6 inches from floor; also fender board not less than 6 inches by 1¼ inches on outside and both ends.

### External Scaffold for Bricklayers and Plasterers.

Standards to be not more than 9 feet apart, and, if hardwood, not less than 4 inches diameter at butt, and 2½ inches at tip; if sawn pine timber they shall not be less than 16 inches sectional area. Standards to be embedded 12 inches in ground or in barrels filled with solid material. Ledgers to be not less than 12 inches sectional area hardwood, or 15 inches sectional area, minimum depth 5 inches, if pine timber, and are to be tied or bolted to standards at spaces of not more than 6 feet apart. First ledger may be fixed at not more than 10 feet from the ground, where circumstances require it.

Putlocks to be of hardwood; where the span does not exceed 5 feet in the clear the sectional area shall be not less than 9 inches spaced not more than 6 feet apart, and to have not less than 4½ inches bearing in wall; all putlocks to be securely wedged in position.

Scaffold boards to be of sound timber not less than 1½ inches thick laid butting or lapping, but where lapped, the laps to be not less than 9 inches; scaffolds to have 9-inch by 1½-inch fender board on all working stages secured to standards; also guard rail not less than 3 feet high of scaffold poles or timber, not less than 6 inches sectional area lashed or bolted to standards or 3½-inch Manilla rope. Openings through guard rail and fender board allowed alongside landings only.

Bracing to be not less than 9 inches sectional area, hardwood poles or sawn pine timber, and placed to the Inspector's satisfaction.

Scaffolds to be secured by Manilla rope not less than 1¾ inch in circumference and 15 feet long, or bolts not less than ⅝ inch diameter fitted with washers. All lashings to be kept properly wedged and bolts properly tightened up.

Where an external scaffold is to be used for plasterers' work only, the standards may be spaced not more than 10 feet apart, ledgers to be not less than 4 inches diameter butt and 2½ inches taper end, or 12 inches sectional area, and spaced to suit the particular class of work, such spacing to be to the satisfaction of the Inspector. Bracing to be not less than 6 inches sectional area.

### Internal Scaffold for Bricklayers.

Internal scaffolds shall be constructed in a similar manner to the external scaffolds, and with timber of a similar section; trestles approved by the Inspector may be used in place of standards. Where the rooms do not exceed a height of 20 feet, the guard rail may be omitted.

The standards may be omitted when the internal or division walls form sufficient bearing for ledgers, the distance between such bearing shall not exceed 8 feet.

### Internal Scaffold for Plasterers, Painters, &c.

Where the height of the scaffold exceeds 15 feet it shall be constructed of hardwood standards of not less than 4 inches diameter at the butt, and 2½ inches at taper end, or 12 inches sectional area, if sawn pine timber, to be spaced not more than 9 feet apart; ledgers to carry the platform of scaffolds to be of 12 inches sectional area if sawn timber, if of round timber to be of similar section to the standards, bolted to standards with ⅝-inch bolts, or properly secured with 1¾-inch Manilla rope; scaffolds under a height of 15 feet to be erected with standards or trestles, to the satisfaction of the Inspector.

### General.

Where buildings exceed two stories in height, immediately after the joists are laid a temporary covering of close boarding shall be laid on the joists or girders directly above where men are working.

All runs and gangways to be constructed to the satisfaction of the Inspector.

## GANTRIES.

Gantry not exceeding 100 feet high for a steam crane to lift a weight of 5 tons, and not exceeding 10 tons, to be constructed as follows: Tripod gantry towers to be not less than 6 feet by 6 feet, and to be constructed with 7-inch by 7-inch corner posts, extending the full height of the gantry, properly fishplated and bolted at junctions; corner posts to be firmly tied together by 9-inch by 3-inch horizontal ties at 10 feet centres, and each side of the tower to be

properly braced with 7-inch by 3-inch diagonal braces, firmly bolted to the corner posts; each tower to have a centre post 10 inches by 10 inches; these posts to extend the full height, and to be firmly fish-plated at junctions, and to be stiffened at intervals with 5-inch by 3-inch stays to the corner posts of each tower. The towers to be constructed by means of horizontal braces, 9 inches by 3 inches, spaced not less than 20 feet apart. Each side of gantry to be braced with diagonal braces of 9 inches by 3 inches, firmly bolted to the timbers of the towers, and at intersections; the towers to rest on 9-inch by 9-inch sleeper plates, and to be tied together at top by 9-inch by 9-inch kerb; all bolts for gantries to be not less than ¾ inch diameter. The back stays of the crane to be tied to the 10-inch by 10-inch centre post by means of two 4-inch by 1-inch wrought iron straps extending over the back stay of the crane and down each side of the centre post. The length of the strap to be 9 feet, and to be firmly bolted to the centre post and to the timbers of the crane by 1-inch bolts. The ends of the straps to be also turned and morticed into centre post 1½ inch. Each centre under the back stays of the crane shall have a platform at the bottom formed of 9-inch by 3-inch timber firmly bolted to the centre posts and to the sides of the tower, and each tower shall be loaded with a weight equal to three times the weight the crane has to lift.

The construction of a tripod gantry not exceeding 100 feet high for a crane to lift from 10 tons to 15 tons to be similar in all respects to the foregoing, with the exception that the corner posts of the towers shall be 8 inches by 8 inches.

Where the circumstances necessitate a gantry exceeding 100 feet in height, it shall constructed to the approval of the Government Architect.

### Lift Boxes.

Lift boxes to carry up to 3 tons to be made of 2-inch oregon properly framed together, each box to have two carrying straps made of 3-inch by ⅝-inch iron passing under the bottom of the box and up each side and secured to the timber with ⅝-inch bolts. Eyelet holes to be formed on top to receive box chains; boxes for lighter loads may be of proportionately lighter construction.

### Ladders.

Ladders for bricklayers, plasterers, and painters shall be of clean oregon with hardwood rungs set in centres; batten ladders to be constructed of 3-inch by 2-inch stiles and 3-inch by 1-inch battens partly sunk into stiles and firmly nailed or screwed. In no instance shall batten ladders exceed 14 feet in length. Batten ladders otherwise shall not be allowed with the exception of roof ladders and gantry ladders on any building or structure upon which work is being carried on.

## HAND CRANES, DERRICKS, &c.

All hand cranes, derricks, or any such similar gear after erection shall, before being put into commission, be tested with a load of 25 per cent. more than that which the crane is designed to lift. Such test is to be in the presence of the Inspector.

Each back stay of any crane shall be loaded with a weight equal to at least three times that which the crane has to lift.

Every hand crane shall have marked in a prominent position the maximum load which the crane is designed to lift.

3. The following regulations are made, added, or substituted in the place and stead of the said annulled Regulations published on the 14th day of August, 1903, and 19th April, 1904, and are to be read and construed as the Regulations contained in Schedule II. of the said Act:—

## HYDRAULIC LIFT, CRANE, AND WHIP REGULATIONS.

4. All cylinders, rams, pipes, valves, or other apparatus subject to hydraulic pressure, shall be tested to a pressure equal to three times the proposed working pressure per square inch, and a certificate under the maker's hand, that they have been successfully tested to stand that pressure, shall be furnished to the Inspector before they are put into use.

5. The whole of the above machinery to be tested to twice the working pressure in the presence of the Inspector, after erection, before being put into commission. The Inspector will give a certificate to the owner if everything is satisfactory. This regulation will apply to any substantial alteration in addition to or reinstatements of existing machinery and pipes.

6. All hydraulic machinery having rams working in cylinders shall be provided with permanent stops (or other approved means) by which the rams will be prevented from being forced out of the cylinders quite independent of any valves or tappet gear.

7. An independent screw-down pressure stop-valve shall be fitted to every machine, and in cases where more than one machine is fixed in the same building, a waste cock, approved by the Inspector, shall be fitted to each machine.

8. A back-pressure valve, non-return valve, or other similar apparatus of approved kind, shall be fitted to every service pipe. This valve to be placed as near to the inlet to the building as possible.

9. A relief valve, loaded to lift when the pressure in the service pipes exceeds 10 per cent. increase of pressure over the ordinary working pressure, to be fitted in all cases where the service pipe exceeds 1 inch in diameter, unless sufficient evidence is given the Inspector that such provision is otherwise provided.

10. All hydraulic cylinders to be fitted with air and drain pipes.

11. Ample provision to be made so that cylinders can be efficiently drained and washed out. Means must also be provided for preventing water syphoning out of the cylinders, and limiting the speed of admission and exhaust.

12. Only piping made specially for hydraulic pressures shall be used; in no case will ordinary steam or water piping be allowed for pressure work. Standard flanges to be screwed on and seated for jointing material; a tee piece to be provided for testing purposes.

13. Efficient means are to be provided for lubricating all working parts of machines.

14. Proper platform, handrail, and ladder must be provided to enable the attendant to oil and tend to all parts of the machinery without risk of accident.

15. In the case of lifts intended for carrying passengers, they must be provided with two or more lifting ropes. If two ropes are used they shall be of such dimensions that when new they will each have a breaking strain of not less than five times the maximum load and the weight of the car. If more than two ropes are used their total factor of safety shall not be less than ten. In the case of lifts used solely for goods not less than two such ropes shall be provided with a combined factor of safety of not less than ten. With cranes and whips where one rope only is provided such rope shall have a factor of safety of not less than ten. Balance weight ropes must have a similar proportion of strength to load.

The minimum diameter of any pulley or sheave shall be not less than fifteen times the circumference of the rope to be used upon it.

16. All overhead construction of any description shall be of sufficient strength and stability and to the approval of the Inspector.

17. Where flying counterbalance is used the weights shall be arranged to operate between suitable guides.

No direct-acting lift is to be fitted with flying balance weights except the ram of such lift is fitted with one or more tie bolts carried from the bottom of the ram to the girders of car platform. All hydraulic or other type of balance to be approved by the Inspector.

18. All cars shall be carried from girders placed underneath. The superstructure of cars to be to the approval of the Inspector, and those passenger cars with more than one entrance shall have all such other entrances fitted with approved gates or doors.

19. Safety gear to be provided for all lifts excepting direct acting, parcels, dinner, and service lifts. The gear must be automatic and positive in action and must be tested by suspending the lift car when fully loaded by means of hempen rope which is to be cut. The car to be raised to any height demanded by the Inspector prior to testing. The main hauling ropes need not be detached, but must be slacked sufficiently to permit of a reliable test.

20. The controlling valve must be of an efficient type, and tested and shall cut off automatically at either limit of travel. The valve must also be made to shut off the water in the case of breakage of the handline. Provision must be made to prevent any material passing

to the plunger, and jambing in the holes thereof, also, that will preclude any possibility of the plunger blowing out should it become parted.

21. The enclosure doors or gates of passenger lifts and goods lifts must be constructed in such a manner that it is impossible to open them from the outside without a key; such key is not at any time to be left in any door. Enclosures, doors or gates of passenger or goods lifts other than on top floors, which will be to the Inspector's approval, must in no instance be less than 5 feet 6 inches in height. The lift well on the side of any car entrance of either goods or passenger lifts shall be without projection and enclosed throughout the travel of the car, unless any such car entrance is fitted with an approved gate or door. The enclosure, gates, or doors to be placed close to the edge of the lift well so as to preclude any possibility of accident.

22. All machinery and well-holes to be enclosed to the Inspector's approval. In case of wh[illegible] hatches, floors to or from which goods are delivered or discharged, they shall be provided with flaps or rolling platforms approved by the Inspector.

23. All lifts, cranes, and whips shall be periodically inspected, and the owners of, or persons using any such lifts, cranes, or whips, shall take such measures as the Inspector may direct, to facilitate any inspection. If everything is considered satisfactory, a certificate will be issued by the Inspector.

24. Any lift which is designed and constructed for the purpose of carrying either goods or passengers shall have a prominent notice stating the maximum load such lift is to carry in goods, of the number of passengers if a passenger lift, and any load, or number of passengers, shall not at any time exceed that which is stated in the said notice. In the case of goods lifts, only the lift attendant and the person attending to the goods shall be permitted in the lift car at any one time. This must be distinctly stated in the notice.

## BELT-DRIVEN, OR OTHER POWER, LIFT, CRANE, AND WHIP REGULATIONS.

25. The general design and description of such lift is to be submitted for the approval of the Inspector.

26. All belting, pulleys, worm gear, spur gear, or friction gear shall be to the approval of the Inspector.

27. Any such lift shall be fitted with efficient brake gear, to operate on the worm shaft automatically, when the machine is stopped. When the angle of any worm is more than the angle of reversibility, efficient provision shall be made to prevent rotation, so that any tendency of the car to descend, except under power, is obviated. All lifts shall be provided with two limit stops, one being controlled by the hand rope, and one an integral part of the lift gear.

28. In no instance will the use of direct spur gearing or direct friction drive be allowed where it is intended that an attendant or passengers are to travel in the car.

29. The striking or reversing gear shall operate by means of one hand-rope or rod, and shall be such as to preclude any possibility of two belts being on the fast pulley simultaneously, with provision made for maintaining the belts in their several proper positions.

30. In the case of drum winding lifts in which any person travels it shall be provided with gear, so that should the lifting ropes by any means become slack, the machine shall automatically stop.

31. Efficient means shall be provided for lubricating all working parts of machines.

32. Proper platform, handrail, and ladder must be provided, to enable the attendant to oil and attend to all parts of machinery without risk of accident.

33. In the case of lifts intended for carrying passengers they shall be provided with two or more lifting ropes; if two ropes are used they shall be of such dimensions that when new, they shall each have a breaking strain of not less than five times the maximum load and the weight of the car; if more than two ropes, their total factor of safety shall be not less than ten. In case of lifts used solely for goods not less than two such ropes shall be provided with a combined factor of safety of not less than ten. With cranes and whips where one rope only is provided, such rope shall have a factor of safety of not less than ten. Balance weight ropes must have a similar proportion of strength to load.

The minimum diameter of any drum, pulley, or sheave shall be not less than fifteen times the circumference of the rope to be used upon it.

34. Sufficient space for the over-running of the cage shall be provided at the top and bottom of the lift-well, to the approval of the Inspector, and such space at the top shall not be less than 3 feet measuring from the top of the car-beam to the underside of the overhead girders or ceiling joists.

35. All lifts operated by means of a winding-drum shall have the drum grooved in such a manner as to conveniently embrace the lifting ropes, or arranged to obviate any tendency of overriding or jambing of the ropes.

In positively driven gears with the ropes permanently attached to the drum, the anchoring of the ropes shall be performed in an efficient and approved manner, and shall be such that not less than one and a half turns of each rope shall be round the drum when the lift-cage is at the top or bottom limit.

36. All overhead construction of any description shall be of sufficient strength and stability, and to the approval of the Inspector.

37. Where flying counter balance is used, the weights shall be arranged to operate between suitable guides.

38. All cars to be carried from girders placed underneath the superstructure of cars to be to the approval of the Inspector, and those passenger cars with more than one entrance shall have all such other entrances fitted with approved gates or doors.

39. Safety gear to be provided for all lifts. The gear must be automatic and positive in action, and must be tested by suspending the lift-car when fully loaded by means of hempen rope, which is to be cut, the car to be raised to any height demanded by the Inspector prior to testing. The main hauling ropes need not be detached, but must be slackened sufficiently to permit of a reliable test.

40. The enclosure doors or gates of passenger lifts or goods lifts must be constructed in such a manner that it is impossible to open them from the outside without a key; such key is not at any time to be left in any door. Enclosures, doors, or gates of passenger or goods lifts other than on top floors, which will be to the Inspector's approval, must in no instance be less than 5 feet 6 inches in height. The lift well on the side of any car entrance of either goods or passenger lifts shall be without projection, and enclosed throughout the travel of the car, unless any such car entrance is fitted with an approved gate or door. The enclosure, gates or doors to be placed close to the edge of the lift well, so as to preclude any possibility of accident.

41. All machinery and well holes to be enclosed to the Inspector's approval. In case of whip hatches, to or from which goods are delivered or discharged, they shall be provided with flaps or rolling platforms, approved by the Inspector.

42. The Inspector shall see and inspect the whole of the machinery and other apparatus intended to be used, before such is put into use. This regulation shall also apply to any substantial alteration or addition to or reinstatements of existing machinery. If everything is considered satisfactory, a certificate will be issued by the Inspector.

43. All lifts, cranes, and whips, shall be periodically inspected, and the owners of or persons using any such lifts, cranes, or whips shall take such measures as the Inspector may direct, to facilitate any inspection. If everything is considered satisfactory a certificate will be issued by the Inspector.

44. Any lift which is designed or constructed for the purpose of carrying either goods or passengers shall have a prominent notice stating the maximum load such lift is to carry in goods, or the number of passengers, if a passenger lift, and any load or number of passengers shall not at any time exceed that which is stated in the said notice. In the case of goods lifts, only the lift attendant and the person attending to the goods shall be permitted in the lift car at any one time. This must be distinctly stated in the notice.

## ELECTRIC LIFT REGULATIONS.

45. The location of the electric apparatus shall be such that it shall not be subject to moisture or dampness of any description.

The whole of the electrical attachments and apparatus shall be entirely and thoroughly insulated from body or earth in an efficient manner, to the approval of the Inspector.

46. The supply main shall be sutiably insulated and fixed, and shall be of sufficient sectional area to carry the maximum current permissible under the rules of the Fire Underwriters' Association of New South Wales.

47. At the nearest point of entrance into a building the supply mains must be connected to suitable and efficient double pole fuses and double pole quick break switch. These fuses are to be guaranteed to break the circuit should the current exceed the normal carrying capacity of the main cables by 50 per cent. The sizes of these fuses shall be accurately determined to secure this result, which is most important.

48. The Inspector shall see and test the whole of the machinery and other apparatus it is intended to be used before such is put into use. The regulation shall also apply to any substantial alteration or additions to or reinstatements of existing machinery. If everything is satisfactory a certificate will be issued by the Inspector.

49. All overhead construction of any description shall be of sufficient strength and stability and to the approval of the Inspector.

50. Sufficient space for the over-running of the cage shall be provided at the top and bottom of the lift well to the approval of the Inspector, and such space at the top shall be not less than 3 feet, measuring from the top of the car beam to the under side of the overhead girders or ceilings joists.

An automatic stop which will instantly break the circuit should the over-run of the car exceed 6 inches shall be fitted to every goods or passenger lift where the Inspector so directs. This stop must be made to actuate from the car.

51. All electric lifting apparatus shall be provided with limit stops or other approved means to prevent overwinding; these stops must be attached to the lift machine.

52. The electric controlling gear must be to the approval of the Inspector, and must be of an efficient type and shall automatically slow down and cut off at either limit of travel. It must operate in a satisfactory manner without causing excessive strain in any part of the apparatus. The electric controls must so operate as to obviate any excessive and deleterious sparking.

53. In the case of lifts intended for carrying passengers, they must be provided with two or more lifting ropes. If two ropes are used they shall be of such dimensions that when new they will each have a breaking strain of not less than five times the maximum load and the weight of the car. If more than two are used their total factor of safety shall be not less than ten. In the case of lifts used solely for goods and freight purposes, not less than two such ropes shall be provided, and each shall have a breaking strain of not less than five times the maximum load for which the apparatus is designed. With cranes and whips where one rope only is provided, such rope must have a factor of safety of not less than ten. The minimum diameter of any sheave or drum shall be not less than fifteen times the circumference of the rope to be used upon it.

54. All electric lifts operated by means of a winding drum shall have the drum grooved in such a manner as to conveniently embrace the lifting ropes, or arranged to obviate any tendency of over-riding or jambing of the ropes.

In positively driven gears with the ropes permanently attached to the drum, the anchoring of the ropes shall be performed in an efficient and approved manner, and shall be such that not less than one and a half turns of each rope shall be round the drum when the lift cage is at the top or bottom limit.

All such apparatus shall be fitted with an automatic device so arranged that should the lifting ropes from any cause whatsoever become slack, the current shall be immediately and automatically cut off.

55. Counter balance weights where used shall be arranged to operate between suitable guides. The ropes attached to same will be subject to similar conditions as the lifting ropes previously mentioned in Regulation 53.

56. All lift machines shall be provided with an efficient brake gear, operated in a manner approved by the Inspector.

57. All cars to be carried on girders placed underneath the car platform. The superstructure of cars to be to the approval of the Inspector.

In passenger cars, constructed with more than one entrance, all such other entrances shall be fitted with approved gates or doors.

The enclosure, doors, or gates of passenger lifts or goods lifts must be constructed in such a manner that it is impossible to open them from the outside without a key; such key is not at any time to be left in any door.

Enclosures, doors, or gates of passenger or goods lifts, other than those on top floors, which will be to the Inspector's approval, must in no instance be less than 5 feet 6 inches in height. The lift well, on the side of any car entrance of either goods or passenger lifts, shall be without projection and enclosed throughout the travel of the car, unless such entrance is fitted with an approved gate or door. The enclosure, gates, or doors to be placed close to the edge of the lift well so as to preclude any possibility of accident.

58. Safety gear is to be provided for all lifts, and must be automatic and positive in action. The gear must be tested by suspending the lift car when fully loaded by means of a hemp rope which is to be cut, the car being raised to any height the Inspector may demand. The main hauling ropes need not be detached, but must be slackened sufficiently to permit of a reliable test.

59. If automatic door switches are used, they shall be constructed in such a manner as to comply with the requirements of the Inspector.

60. All machinery and well holes to be enclosed to the Inspector's approval. In the case of whip hatches, floors to or from which goods are delivered or discharged, they shall be provided with flaps or rolling platforms approved of by the Inspector.

61. All lifts, cranes, and whips shall be periodically inspected, and the owners of or persons using any such lifts, cranes or whips shall take such measures as the Inspector may direct, to facilitate any inspection. If everything is considered satisfactory a certificate will be issued by the Inspector.

62. Any lift which is designed or constructed for the purpose of carrying either goods or passengers shall have a prominent notice stating the maximum load such lift is to carry in goods or the number of passengers, if a passenger lift, and any load or number of passengers shall not at any time exceed that which is stated in the said notice. In the case of goods lifts, only the lift attendant and the person attending to the goods shall be permitted in the lift car at any one time. This must be distinctly stated in the notice.

Given under my Hand and Seal of the said State, at Sydney, this sixteenth day of January, in the year of our Lord one thousand nine hundred and five, and in the fourth year of His Majesty's Reign.

By His Excellency's Command,

CHARLES A. LEE.

## CITY OF SYDNEY IMPROVEMENT ACT, 1879, 42 VIC. NO. 25.

### RULES RELATING TO THE THICKNESS OF WALLS.

### CLASSES OF BUILDINGS.

FIRST CLASS.—If built originally as a dwelling house, or to be occupied or intended to be occupied as such, then it is to be deemed to belong to the first or dwelling house class.

SECOND CLASS.—If a building be built originally as a warehouse, storehouse, granary, brewery, distillery, manufactory or workshop, or be occupied or intended to be occupied as such, or for a similar purpose, then it is to be deemed to belong to the second or warehouse class.

THIRD CLASS.—If a building be built originally as a church, chapel, or other place of public worship, college, hall, hospital, theatre, public concert room, public ball room, public lecture room, public exhibition room, or occupied or intended to be occupied as such, or for a similar purpose, or otherwise used or intended to be used either temporarily or permanently for the assemblage of persons in large numbers, whether for public worship, business instruction, debate, diversion, or resort, then it is to be deemed to belong to the third or public building class.

If a building originally built or subsequently altered, so as to bring it within any one class, be subsequently converted into or used as a building of another class, then it is to be deemed to belong to such other class and as to it all the conditions prescribed with regard to buildings of the same rate as such other class must be fulfilled as if it had been originally built of such class, subject, nevertheless, to such modifications as shall be sanctioned by the surveyor on supervision thereof; or if a building be used partly as a dwelling house or partly for any purpose which would bring it within the second or warehouse class, and as to it all the conditions prescribed with regard to buildings of the same rate of such class must be fulfilled, as if it had been originally built of such class, subject, nevertheless, to such modifications as shall be sanctioned by the surveyor on supervision thereof.

The height of every building is to be ascertained by measuring from the top of the footings thereof to the top of the wall.

The stories of every building are to be counted from the foundations upwards, and if the space in height between the top of the footings and the level of the lowest floor do not exceed six feet, then the story nearest the foundations is to be considered the lowest or first story, but if such space exceed six feet then such space is to be considered to contain the lowest or first story, and in that case the top of the footings is to be considered the level of the lowest floor.

If any external or party wall, measured from centre to centre, is not more than twenty-five feet distant from any other external or party wall to which it is tied by the beams of any floor or floors other than the ground floor or the floor of any story formed in the roof, the length of such wall is not to be taken into consideration, and the thickness of the wall will be found in the second vertical column in the table.

If any story exceed in height sixteen times the thickness prescribed for the walls of such story in the above table, the thickness of each external and party wall throughout such story shall be increased to one-sixteenth part of the height of the story, but any such additional thickness may be confined to piers properly distributed of which the collective widths amount to one-fourth part of the length of the wall.

No story enclosed with walls less than thirteen inches in thickness shall be more than ten feet in height.

The thickness of any wall of a dwelling house, if built of materials other than bricks, shall be deemed to be sufficient if made of the thickness required by the tables, or of such less thickness as may be approved by the City of Sydney Improvement Board, with this exception, that in the case of walls built of stone in which the beds of the masonry are not laid horizontally, no diminution shall be allowed in the thickness required by the foregoing rules for such last-mentioned walls.

TABLE I.

Rule as to buildings not being of the public buildings or buildings of the warehouse class:—

| Height up to | | Exceeding 45 feet. |
|---|---|---|
| 100 feet. | Length up to 45 feet<br>One story, 26 inches<br>Two „ 22 „<br>Three „ 18 „<br>Remainder 13½ „ | Wall to be increased in thickness on each of the stories by 4½ in. (subject to provision respecting distribution in piers). |
| 90 feet. | Length up to 45 feet<br>One story, 26 inches<br>One „ 22 „<br>Three „ 18 „<br>Remainder 13½ „ | Exceeding 45 feet.<br>Same as above. |
| 80 feet. | Length up to 45 feet<br>One story, 22 inches<br>Three „ 18 „<br>Remainder 13½ „ | Exceeding 45 feet.<br>Same as above. |
| 70 feet. | Length up to 45 feet<br>One story, 22 inches<br>Two „ 18 „<br>Remainder 13½ „ | Exceeding 45 feet.<br>Same as above. |
| 60 feet. | Length up to 45 feet<br>Two story, 18 inches<br>Remainder 13½ „ | Exceeding 45 feet.<br>One story, 22 inches.<br>Two „ 18 „<br>Three „ 13½ „ |
| 50 feet. | Length up to 30 feet<br>One story, 18 inches<br>To below topmost story, 13½ inches<br>Remainder, 9 inches<br>Length up to 45ft.<br>Two stories, 18 inches<br>Remainder, 13½ „ | Exceeding 45 feet.<br>One story, 22 inches<br>One „ 18 „<br>Remainder 13½ „ |
| 40 feet. | Length up to 35 feet.<br>To below topmost story, 13½ inches<br>Remainder, 9 inches | Exceeding 35 feet.<br>One story, 18 inches.<br>Two below topmost story, 13½ inches.<br>Remainder, 9 inches. |
| 30 feet. | Same as above. | Same as above. |
| 25 feet. | Length up to 30 feet<br>Two stories, 9 inches<br>If more than two stories, to below topmost story, 13½ ins.<br>Remainder, 9 inches | Exceeding 30 feet.<br>To below topmost story, 13½ inches.<br>Remainder, 9 inches. |

TABLE 2.

Rule as to buildings of the public and warehouse class.

(All buildings, except public buildings and such buildings as are defined to be buildings of the warehouse class shall, as respects the thickness of the walls, be subject to the rate given for dwelling houses.)

| Height up to | Length up to 45 feet | Exceeding 45 feet. |
|---|---|---|
| 100 feet. | Base, 26½ inches | Wall to be increased in thickness from base to within 16 feet of the top by 4½ inches (subject to provision respecting piers). |
| 90 feet. | Same as above. | Same as above. |
| 80 feet. | Length up to 45 feet, Base, 22 inches | Same as above. |
| 70 feet. | Same as above. | Same as above. |
| 60 feet. | Same as above. | Exceeding 45 feet. Base, 26 inches. |
| 50 feet. | Length up to 30 feet. Base, 18 inches Length up to 45 feet Base, 22 inches. | Same as above. |
| 40 feet. | Length up to 35 feet. Base, 13½ inches. Length up to 45 feet. Base, 18 inches | Exceeding 45 feet. Base, 22 inches. |
| 30 feet. | Length up to 45 feet. Base, 13½ inches. | Exceeding 45 feet. Base, 18 inches. |
| 25 feet. | | Length unlimited. Base, 13½ inches. |

The thickness of the walls of buildings of the warehouse class at the top, and for 16 feet below the top, shall be 13 inches, and the intermediate parts of the wall between the base and such 16 feet below the top shall be built solid throughout the space between straight lines drawn on each side of the wall and joining the thickness at the base to the thickness at 16 feet below the top as above determined; nevertheless, in walls not exceeding 30 feet in height the walls of the topmost story may be 8½ inches.

If in any story of a building of the warehouse class the thickness of the walls as determined by the rules hereinbefore given is less than one-fourteenth part of the height of such story, the thickness of the wall shall be increased to one-fourteenth part of the height of the story; but any such additional thickness may be confined to piers, properly distributed, of which the collective widths amount to one-fourth part of the length of the wall.

The thickness of a cross wall shall be two-thirds of the thickness hereinbefore required for an external or party wall of the same dimensions and belonging to the same class of buildings, but never less than 8½ inches, and no wall sub-dividing any building shall be deemed to be a cross wall unless it is carried up two-thirds of the height of the external or party wall, and unless the recesses and openings therein do not exceed one-half of the vertical surface of the wall in each story.

# LEGAL NOTES.

## RELATING TO BUILDERS AND CONTRACTORS AND ARCHITECTS.

### TENDERS.

*Tenders for Work or Goods.*

A person who, by writing or by word of mouth, invites tenders for work to be done, or offers of or for goods for purchase or sale, does not by such invitation impliedly promise to accept any tender or offer, the invitation or notice to the effect that "tenders will be received," being no more than an announcement (unless it is expressly stated otherwise) that he is willing to receive tenders or offers (*Spencer* v. *Harding*, 5 L. R. C. P. 561).

But an unconditional tender to undertake work, or to supply goods, on specified terms, and the acceptance of such by the person to whom it is made, will be sufficient to constitute a binding contract; and an intimation in the acceptance of such tender, that a "contract will be prepared," merely means that a formal contract is to be drawn up (*Lewis* v. *Brass*, 3 L. R. Q. B. D. 667). If, however, the terms of the tender or acceptance imply that the proposed agreement is to be *subject* to the preparation and approval of a formal contract, there will be no binding agreement until the formal contract is completed (*Winn* v. *Bull*, 7 L. R. Ch. D. 29).

*When Contracts should be in Writing.*

A contract to build, alter, or repair a house, or any other construction, and to provide materials for the purpose, need not be in writing, unless it is *not to be performed within a year;* a contract to build, alter, or repair a house, etc., not being in law a contract for the sale of goods, even as regards the materials, but being an entire contract for work and materials.

But as regards building or other contracts which are not to be performed within a year—that is, contracts the complete performance of which will necessarily extend over more than a year, or the performance of which is intended by the parties to extend over more than a year—by the Statute of Frauds (29 Ch. II. c. 3, s. 4) "no action shall be brought . . . . upon any agreement that is not to be performed within the space of one year from the making thereof, unless the agreement upon which such action shall be brought, or some memorandum or note thereof, shall be in writing and signed by the party to be charged therewith, or some other person thereunto by him lawfully authorised."

It is not necessary in every case that there should be a formal contract drawn up with technical precision or legal formalities. Any memorandum under the hand of the "party to be charged," which was made before action brought, and which names the contracting parties,

or so describes them as to identify them, and which contains, either expressly or by references to other written papers, the terms of the agreement, will be sufficient to satisfy the Statute of Frauds, although it be merely a recognition or adoption of a prior written statement of such terms not signed by the party. But a memorandum expressing a *mere purpose* or *intention* is not sufficient to satisfy the Statute. Again, where a contract or note in writing exists which binds one party, any *subsequent* note in writing, signed by the other, will be sufficient to bind him, provided it either contains in itself the terms of the contract, or refers to any writing which does contain them.

Building contracts entered into with a corporate body, to be binding upon the corporation, should be made under seal (*Hunt* v. *Wimbledon Local Board*, 4 L. R. C. P. D. 48; *Young* v. *Mayor of Leamington*, 8 L. R. Q. B. D. 579). But trading corporations can contract without seal for matters essential to the purpose for which they are formed (*South of Ireland Colliery Company* v. *Waddle*, 38 L. J. C. P. 338).

*Contracts for Sale of Goods.*

By the Statute of Frauds, a contract for the sale of any goods *of the value of* £10 *or upwards* shall not be enforceable by action unless (i) the buyer shall accept part of the goods so sold, and actually receive the same; or (ii) give something in earnest to bind the contract, or in part payment; or (iii) unless some note or memorandum in writing of the contract be made and signed by the party to be charged or his agent in that behalf: and these provisions are to apply to every such contract, notwithstanding that the goods may be intended to be delivered at some future time, or may not at the time of such contract be ready for delivery.

There is an "acceptance" of goods within the meaning of the Act when the buyer does any act in relation to the goods which recognises a pre-existing contract of sale.)

*Contracts with Building Committees.*

Where a building contract is entered into with the trustees of a building fund, as of a church, chapel, or school, the contract may be so framed as to limit the liability of the trustees to the period during which they remain trustees, as well as to exempt such trustees from all personal liability, binding them only to the extent of the building fund (*Williams* v. *Hathaway*) 6 L. R. C. D. 544.

*Death of Employer before Building Contract completed.*

It is a presumption of law, that the parties to a contract bind not only themselves but their personal representatives, except in the case of contracts involving the exercise of individual personal skill, such as a contract to paint a picture. And so, in the case of a building contract, where the employer dies before the contract is completed, his executors or administrators are bound not only to pay such

sums as may be due for work already done under contract, but to carry out the deceased employer's obligations so far as they remain unfulfilled under the contract; and, on the other hand, the executors or administrators of such deceased employer will be in a position to bring an action against the builder if he fail to carry out his part of the contract (*Wentworth* v. *Cook*, 10 Adolphus & Ellis, 42; *Cooper* v. *Jarman*, 3 L. R. Eq. 98).

*Contracts of Hiring.*

It is sometimes advisable that contracts of hiring and service should be in writing, in view of the provision made by s. 4 of the Statute of Frauds as to "agreements not to be performed within the space of one year from the making thereof."

It should also be remembered that where no time is limited, either expressly *or by implication*, for the duration of a contract of hiring and service, the hiring is considered, in law, a hiring for a year. And this rule applies to all contracts of hiring and service, whether written or verbal, whether express or implied, and whatever the nature of the service (*R.* v. *Worfield*, 5 T. R. 506: *Emmens* v. *Elderton*, 13 C. B. 495). But it does not apply where the contract contains stipulations inconsistent with the application of it (*Baxter* v. *Nurse*, 6 M. & G. 935). Nor does the rule apply where there has been a service, but no contract of hiring, and no circumstances from which a contract can be implied (*Beeston* v. *Collyer*, 4 Bing. 313).

If the agreement is to do work by the job, it cannot be considered a yearly hiring, although the job last more than a year (*R.* v. *Woodhurst*, 1 B. & Ad. 325). But if the hiring be for a year, a mere stipulation for payment by piece-work will not render it the less a yearly hiring (*King's Norton* v. *Cambden*, 2 Str. 1139). In a case where the hiring was at 3s. per week "all the year round," with liberty to leave on a fortnight's notice, this was held to be a yearly hiring (*R.* v. *Birdbrooke*, 4 T. R. 245).

Where the *only circumstance* from which the intended duration of a contract of hiring and service can be inferred is the *reservation of wages weekly*, it must be taken to be a weekly hiring. But if there be anything in the contract of hiring to show that it was intended to be for a year, the reservation of weekly wages will not control it.

All contracts of hiring and service are put an end to by the death of the master, and therefore the executors or administrators of the master cannot bring an action to enforce a contract of service after his death.

An indenture of apprenticeship is dissolved by the death of either master or apprentice (*R.* v. *Peck*, 1 Salk. 68). But where the apprentice is bound to two masters, on the death of one he becomes the apprentice of the survivor (*R.* v. *St. Martin*, 1 Harr. & W. 69).

*Building and Leasing Agreements.*

Where an owner of land agrees with a builder that, upon the erection of houses upon such land in conformity with the terms and conditions of the agreement, the owner will grant to the builder leases of separate plots of such land, such an agreement is a separable contract; and the builder (or assignee of such agreement) will be entitled to have leases of particular plots granted to him upon his performance of the agreement so far as those plots are concerned, although he may be unable to carry out the agreement in its entirety (*Williamson* v. *Clements*, 8 L. R. Ch. 96).

It has been held by the Court of Appeal that a building containing several residential flats constitutes only one house within the meaning of the word "house" in a covenant not to erect more than a certain number of houses, unless there is some context which cuts down or alters the popular interpretation of the word (*Kimber* v. *Admans*, C. A. [1900] 1 Ch. 412).

*Architect's Certificates.*

Where an architect's certificate that work has been done in a satisfactory manner is a condition precedent to payment under a building contract, a letter from the architect inclosing the builder's account, or a mere checking of the account by the architect, is not sufficient; but the architect's certificate must be in terms showing that the work has actually been done (*Morgan* v. *Binnie*, 9 Bingham, 672).

But when an architect has fraudulently, and in collusion with the employer, withheld a certificate that the builder has satisfactorily executed the work he had undertaken, the builder, if the contract was made with him by the architect as the agent of the employer, can sue the architect for damages (*Ladbrook* v. *Barrett*, 46 L. J. C. P. D. 798; and see *Milner* v. *Nield*, 5 Ex. 829). And where the contract is made direct with the employer, and not through the architect, the builder under similar circumstances may proceed against the architect (*Stevenson* v. *Watson*, 48 L. J. C. P. 318).

Where an architect has acted "improperly and unfairly in the exercise of the powers conferred on him by the contract," so that the builder is a loser through his misconduct, the builder will be entitled to recover from the employer the full amount to which he is entitled under the contract (*Pawley* v. *Turnbull*, 3 Gifford, 70).

But an action will not lie against an architect for carelessly and negligently performing the work required to give a certificate, unless fraud be also established, the duties of the architect in relation to granting a certificate being not ministerial but judicial (*Stevenson* v. *Watson*, 48 L. J. C. P. 318).

Where a building contract provided that the decision of the architect as to the execution of works should be final and without appeal, and the building-owner refused to pay a portion of the architect's fees, on the ground of alleged negligence by the architect in not deducting from the builder's account a sufficient amount for work not actually done, it was held by the Court of Appeal that, although the architect's certificate was final as between the building-owner and the builder, the building-owner was not bound by it as between himself and the architect (In re *Rogers*, architect: see *Architect*, Nov. 20, 1891).

*Charges of Quantity Surveyor.*

It was decided in 1892 that the "reasonable usage" of the building trade is that the builder whose tender is accepted is liable to the quantity surveyor for the amount due for taking quantities; but if no tender be accepted, the building owner or architect is liable (*North* v. *Bassett*, 1 Q. B. 333).

*Extras.*

Where a claim is made for extras, it must be shown from the original contract what was intended to be included therein, so that what will constitute extras may be ascertained (*Buxton* v. *Cornish*, 12 M. and W., 426).

In a case where a builder had contracted to build and complete a house according to a specification, and the specification, while mentioning the scantling of joists for the floors, rafters, and ridge and wall plates, made no mention of the flooring, it was held that the builder could not charge the flooring as an extra; the agreement and specification, taken together, making it clear that the builder could not have reasonably supposed the flooring would be an extra (*Williams* v. *Fitzmaurice*, 3 H. and N., 844).

Where it is stipulated in a building contract that additions made under "an order in writing" shall be paid for, the builder cannot claim payment for extras which may be done without such order, even though done at the verbal request of the employer (*Russell* v. *Bandeira*, 13 C. B. N. S. 149; *Westwood* v. *Secretary of State for India*, 7 L. T. N. S. 736; *Franklin* v. *Parke*, 6 L. T. N. S. 291). And even though payments in advance have been made on the architect's certificates after variations have been made, these will not obviate the necessity of showing that "orders in writing" directing the variations were given as required by the contract, to enable the builder to make a valid claim for payment for such variations (*Tharsis Sulphur & Copper Company* v. *McElroy*, 3 L. R. App. Cas. 1040).

Mere sketches of extra work, drawn by the architect, and by him handed to the builder, are not in themselves a sufficient compliance with a requirement that extras are to be done under an order "in writing" (*Myers* v. *Sarl*, 30 L. J. Q. B. 9).

But where it was stipulated in a building contract that no extras should be allowed without a written order, and that in case of dispute the architect's decision was to be final, and the architect at the end of the contract made a certificate allowing extra work for which no written order had been given; it was held that neither employer nor builder could raise the question whether a sufficient order had been given, unless the conduct of the architect in making the certificate had been fraudulent (*Goodyear* v. *Mayor of Weymouth*, 35 L. J. C. P. 12).

*Rights to Light and Air.*

By the Prescription Act, a right to the use of light for a dwelling house, workshop, or other building is obtained by the enjoyment of it for twenty years without interruption, unless the right was enjoyed only by consent or agreement in writing (2 & 3 Will. IV. c. 71, s. 3).

But it has recently been determined (1904) by the House of Lords (i) that an owner of ancient lights, in case of interference therewith by new buildings, is not as a matter of common law entitled to the same amount of light as his premises enjoyed before the interference; and (ii) that the Prescription Act has not the effect (which has sometimes been attributed to it) of giving him an absolute right to the full amount of light enjoyed for 20 years. He is only entitled (it was decided) to such an amount of light as is necessary according to ordinary notions for the beneficial use of his property; and any obstruction of his light, to justify the grant of an injunction, must be of such a degree as to constitute a nuisance (*Colls* v. *Home and Colonial Stores* (reversing judgment of Court of Appeal), H. L. (E.) [1904] A. C. 179; L. R. [1902] 1 Ch. 302).

Although the owner of ancient lights may improve his light, he must not increase it (*Jones* v. *Tapling*, 31 L. J. C. P. 342); and if an attempt is made by the owner of a tenement to enlarge his lights, or to add new ones, the adjacent owner may obstruct them until they are reduced to the original form and number (*Garritt* v. *Sharp*, 3 A. & E. 325).

Ancient lights cannot, however, be obstructed merely because the owner has opened new ones; but only where, in obstructing the new lights, the owner of the adjacent property unavoidably obstructs the ancient ones also (*Binckes* v. *Pash*, 31 L. J. C. P. 121).

Where the light of a dwelling house or other building has been unlawfully obstructed for six years or more, without steps being taken to oppose it, the Court will be reluctant to interfere (*Gaunt* v. *Fynney*, 42 L. J. Ch. 122).

When a building having rights to ancient lights is pulled down, the rights to light are not thereby extinguished; and upon being satisfied that the owner intends to re-erect the building, the Court will grant an injunction to restrain an erection of premises interfering with such rights to light (*Ecclesiastical Commissioners* v. *Kino*, 49 L. J. Ch. Ap. 529).

Ancient lights may be abandoned in the re-erection of a building by deviating from the original line of frontage, so that a new term of 20 years will have to run to establish an easement; but the *mere setting back* of ancient lights in parallel lines is not abandonment (*National and Provincial Plate-glass Ins. Co.* v. *Prudential Ins. Co.*, L. R. Ch. D. 757; 46 L. J. 871).

Rights to air are not recognised to the same extent as rights to light, and no prescriptive right to air can be acquired under the Prescription Act (*Potts* v. *Smith*, 38 L. J. Ch. 58). The right to an access of air as well as light by a window may be acquired by prescription, but the right to enjoy an open prospect cannot be acquired except by agreement (*Dalton* v. *Angus*, 6 App. Cas. 740; 50 L. J. Q. B. 748). There can be no prescription for a free passage of air to a windmill over the open land of another owner (*Webb* v. *Bird*, 31 L. J. C. P. 335). Accordingly, in a recent case it was laid down by the Court of Appeal that, although a right to have air come over a neighbour's land in a particular channel to a particular place may be established by immemorial user, yet, in the absence of actual contract, no one can claim a right to have the general current of air over his neighbour's property kept uninterrupted (*Chastey* v. *Ackland*, C. A. [1895] 2 Ch. 389). Thus, an interference with the direction of a current of air has been held not to be actionable, although productive of grave inconvenience and even injury, as in a case where the defendants had raised the height of their house, with the result that the plaintiff's chimneys "smoked" (*Bryant* v. *Lefever*).

## FIXTURES.

"Tenant's fixtures" are personal chattels annexed to the freehold by the tenant during his occupancy, either for mere ornament and convenience or for the purpose of his trade, and which he has a right to sever during such occupancy in the absence of any express stipulation or local custom to the contrary.

"Landlord's fixtures" are those put up by the landlord before or during the term of the tenant's occupancy, or by any previous owner or tenant or by any other person; also such fixtures put up by the tenant during the term as the tenant has no right to remove. All these constitute part of the freehold, and also part of the premises demised. In a more confined sense, "landlord's fixtures" are the fixtures which are on the premises at the time of letting to the tenant and are demised therewith, and which are usually specified in a schedule to the lease or agreement; and to these may be added erections and fixtures subsequently added by the tenant, which he is not entitled to remove during his occupancy.

Amongst articles put up for ornament or for convenience of a tenant which have been held to be removable as *tenant's fixtures*, are: —hangings, tapestry, and pier-glasses, whether nailed to the walls or panels or put up in lieu of panels; cornices; marble and other ornamental chimney-pieces; marble slabs; window-blinds; wainscot when *screwed* to the walls; grates, stoves, and ranges, although fixed in brickwork; iron backs to chimneys; beds fastened to the walls or ceilings; fixed tables; furnaces and coppers; pumps; mash-tubs; fixed water-tubs; coffee and malt mills; cupboards fixed with hold-fasts; bookcases standing on brackets and screwed to the walls, clock-cases; iron ovens. But such fixtures can only be removed if the removal can be effected without material damage to the freehold.

A wider rule prevails at law with respect to trade fixtures than to fixtures for mere ornament or convenience of an occupier. Thus, a nurseryman is allowed to remove his greenhouses, but a private individual is not (*Wyndham* v. *Way*, 4 Taunton, 316). But greenhouses built in a garden, and constructed of wooden frames fixed with mortar to foundation walls of brickwork, cannot be removed by the occupier who built them; nor may a boiler built into the masonry of the greenhouse be removed by the tenant; but the pipes of a heating apparatus which is connected with the boiler by screws may be removed by him (*Jenkins* v. *Gething*, 2 Hemming and Johnson, 520).

Among appliances which have been held to be *trade fixtures removable by a tenant* (in the absence of express stipulations to the contrary in the lease) are:—furnaces, vats, coppers; dyeing and brewing vessels, and pipes belonging thereto; steam-engines, and chimneys belonging thereto; baking-ovens; cider-mills; salt-pans. Machinery, engines, plant, and utensils used in trade, however bulky or complex, may be taken to pieces and removed; also a temporary shed erected for the purpose of protecting a steam-engine or machinery, or for other temporary purpose: but if the building stand on stone or brick foundations let into the soil, and is so constructed as not to be removable without the entire destruction of the fabric, it cannot be disannexed from the freehold and taken away.

A tenant should always remove his fixtures prior to the determination of his tenancy; for after he has quitted the premises he cannot re-enter for the purpose of severing and removing his fixtures without express permission (*Lyde* v. *Russell*, 1 B. and A. 394; *Minshall* v. *Lloyd*, 2 M. and W. 450).

And in whatever mode a lease or other tenancy be determined, the tenant has no right (unless protected by special contract) to remove his fixtures after he has ceased to be in lawful possession. Thus, where a tenant had forfeited his lease by an act of bankruptcy, and the landlord re-entered, it was held that the landlord was absolutely entitled to all fixtures remaining upon the premises at the date of the re-entry (*Pugh* v. *Arton*, 38 L. J. Ch. 619).

## EMPLOYERS' LIABILITY ACT, 1897.

Where personal injury is caused to a workman—

(1) By reason of any defect in the condition of the ways, works, machinery, or plant connected with or used in the business of the employer: or

(2) By reason of the negligence of any person in the service of the employer who has any superintendence entrusted to him whilst in the exercise of such superintendence; or

(3) By reason of the negligence of any person in the service of the employer to whose orders or direction the workman at the time of the injury was bound to conform and did conform, where such injury resulted from his having so conformed; or

(4) By reason of the act or omission of any person in the service of the employer done or made in obedience to rules or by-laws of the employer, or in obedience to particular instructions given by any person delegated with the authority of the employer in that behalf; or

(5) By reason of the negligence of any person in the service of the employer who has the charge or control of any signal, points, locomotive-engine, or train upon a railway,

the workman, or in case the injury results in death, the legal personal representatives of the workman, and any persons entitled in case of death, shall have the same right of compensation and remedies against the employer as if the workman had not been a workman of nor in the service of the employer, nor engaged in his work (s. 4).

A workman shall not be entitled under this Act to any right of compensation or remedy against the employer in any of the following cases:

(1) Under sub-section one of section 4 unless the defect therein mentioned arose from, or had not been discovered or remedied owing to the negligence of the employer, or of some person in the service of the employer, and entrusted by him with the duty of seeing that the ways, works, machinery, or plant were in proper condition.

(2) Under sub-section four of section 4, unless the injury resulted from some impropriety or defect in the rules, by-laws or instructions therein mentioned.

(3) Under sub-section 6 of section 4, unless the defect arose from or had not been discovered or remedied owing to the negligence of the employer or of some person in the service of the employer and entrusted by him with the duty of seeing that the gearing, etc., were in proper condition.

(4) In any case where the workman knew of the defect or negligence which caused his injury, and failed within a reasonable time to give, or cause to be given, information thereof to the employer, unless he was aware that the employer or such superior already knew of the said defect or negligence.

*Amount Recoverable for Compensation.*

The amount of compensation recoverable under this Act shall not exceed such sum as may be found to be equivalent to the estimated earnings, during the three years preceding the injury, of a person in the same grade employed during those years in the like employment and in the district in which the workman is employed at the time of the injury (s. 10).

*Time within which Compensation may be Claimed.*

An action for the recovery under this Act of compensation for an injury shall not be maintainable unless notice that injury has been sustained is given within six weeks, and the action is commenced within six months from the occurrence causing the injury, or, in case of death within twelve months from the time of death: Provided always, that in case of death the want of such notice shall be no bar to the maintenance of such action if the judge shall be of opinion that there was reasonable excuse for such want of notice (s. 6).

*Where Money payable under Penalty.*

There shall be deducted from any compensation awarded to any workman, or representatives of a workman, or persons claiming by, under, or through a workman in respect of any cause of action arising under this Act, any penalty or part of a penalty which may have been paid in pursuance of any other Act of Parliament to such workman, representatives, or persons in respect of the same cause of action arising; and where an action has been brought under this Act by any workman, or the representatives of any workman, or any persons claiming by, under, or through such workman for compensation in respect of any cause of action arising under this Act, and payment has not previously been made of any penalty or part of a penalty under any other Act of Parliament in respect of the same cause of action, such workman, representatives, or person shall not be entitled thereafter to receive any penalty or part of a penalty under any other Act of Parliament in respect of these same cause of action (s. 11).

*Service of Notice of Injury.*

Notice in respect of an injury under this Act shall give the name and address of the person injured and shall state in ordinary language the cause of the injury and the date at which it was sustained, and shall be served on the employer, or if more than one employer, upon one of such employers.

The notice may be served by delivering the same to or at the residence or place of business of the person on whom it is to be served, or by post by a registered letter addressed to such person at his last known place of residence or place of business, and if served by post shall be deemed to have been served at the time when a letter containing the same would be delivered in the ordinary course of post; and, in proving the service of such notice, it shall be sufficient to prove that the notice was properly addressed and registered.

Where the employer is a body of persons corporate or incorporate, the notice shall be served by delivering the same at, or by sending it by post in a registered letter addressed to the office, or, if there be more than one office, any one of the offices of such body.

A notice under this section shall not be deemed invalid by reason of any defect or inaccuracy therein, unless the judge who tries the action arising from the injury mentioned in the notice, shall be of opinion that the defendant in the action is prejudiced in his defence by such defect or inaccuracy, and that the defect or inaccuracy was for the purpose of misleading (s. 8).

*Definitions.*

For the purposes of this Act, unless the context otherwise requires—

The expression "person who has superintendence entrusted to him" means a person whose sole or principal duty is that of superintendence, and who is not ordinarily engaged in manual labour. The expression "employer" includes a body of persons corporate or incorporate. The expression "workman" means a railway servant, and any person to whom the "Employers' and Workman Act, 1875," applies (s. 8).

*Liability of Employer for Injury to Workman.*

The law as to compensation for personal injuries received by a workman when engaged on work for an employer was amended by the Employers' Liability Act 1897. The Act will be found set out at pages following; and some important decisions bearing upon the interpretation of that Act are given below.

It was held by the House of Lords, with regard to risks of injury undertaken by a workman in the course of his employment (sect. 4 of the Act of 1897), that when a workman engaged in an employment not in itself dangerous is exposed to danger from an operation in another department over which he has no control, which danger has been created or enhanced by the employer's negligence, the mere fact that the workman undertakes or continues in such employment with knowledge of the danger does not preclude him from recovering damages from an employer; and the question whether he has so distinctly agreed to run the risk involved as to free the employer from responsibility, is a question of fact—that is, a matter to be decided by a jury—and not a question of law (*Smith* v. *Baker & Sons*, H. L. (1891) App. Cas. 325).

Under the rule of law, where injuries received by a workman were occasioned by the negligence of a fellow-workman, what was known as the doctrine of "common employment" was held by the courts to apply, so that the employer was not liable for such injuries. This doctrine was not abolished, but only modified (though to a large extent), by the Act of 1897. It was held by the House of Lords that, in an action to recover damages for injury caused by the negligence of a fellow-workman, the defence of "common employment" will not apply, unless both the injured workman and the workman whose negligence caused the injury were not only engaged in a common employment but were working for the same employer. In the case in question, the injured workman was in the employment of a firm of builders, while the workman whose negligence caused the injury was employed by some iron-founders who were engaged upon the same job as the builders, though under a separate contract; and although the two workmen were at the time engaged in a common employment, the iron-founders were held responsible for the injury to the builder's workman (*Johnson* v. *Lindsay*, H. L. (1891) App. Cas. 371).

In a case decided in 1892, it was held that the words "defect in condition of works" (s. 4, sub-section 1), apply to "works" not on the premises of the employer; so that a builder was held liable for injury caused to a workman in his employ by the fall of a wall which his workmen were pulling down, and which he had neglected to have properly shored up (*Brannagan* v. *Robinson*, 1 Q. B. 344).

*Payment of Smaller Sum "in settlement" of Debt.*

It is well established (though commonly overlooked by business men) that *a mere cash payment* in lieu of a larger sum actually owing, though accepted in satisfaction by the creditor, does not in law discharge the debtor, there being in such case no "consideration" for the creditor's promise not to ask for the balance, and hence no contract enforceable at law (Co. Litt. 212 b; *Cumber* v. *Wane*, 1 Str. 426; *Foakes* v. *Beer*, H. L. 9 App. Cases 605).

But it is otherwise if the larger sum claimed be *in dispute*, and the smaller sum is accepted in consideration of the settlement of the dispute as to the amount of the debtor's liability, thus avoiding legal proceedings; or if the settlement (as commonly done with a body of creditors) is *by deed*, which of itself imports a consideration. And an offer by the creditor to "take a cheque" (or other negotiable instrument) for the smaller sum, in settlement of his claim, also imports a new consideration, the debtor's only obligation being to pay in cash; and such offer, if acted on by the debtor, operates to make a legal contract discharging the debt (*Solree* v. *Tripp* [1846] 15 M. & W. 23).

After six years any claim for the balance, if it has not been enforced by the creditor, will be barred by the Statute of Limitations. But the effect of the statute may be avoided by a subsequent acknowledgment of the debt.

*Proffer of Cheque "in settlement."*

When a cheque is sent by a debtor with an intimation that it is sent "in settlement" of a claim, it is a mistake to suppose that the creditor must return the cheque if he maintains that a larger amount is due to him. In two cases that went to the Court of Appeal, the defendant in each case had sent to the plaintiff a cheque for a smaller amount than was claimed, stating that it was intended to be "in settlement." The plaintiffs, however, both replied that they accepted the cheques "on account;" and in each case it was held that the plaintiff was not precluded from suing for the balance of his claim (*Miller* v. *Davies*, 58 L. J. R. Q. B., 293; *Day* v. *M'Lea*, L. R. 22 Q. B. D. 610, 612).

If, after a proper tender of an amount "in settlement," and the refusal by the creditor to accept such amount on account, the creditor should sue the debtor for the full amount claimed by him, he will (if successful) "recover" in the action only the amount on which he and the debtor have been at issue, and will be entitled to no more costs than are allowable on an action for the disputed amount (*James* v. *Vane*, 2 E. & E. 883; 29 L. J. Q. B. 169).

*Payment of Wages.—Truck Act.*

By the Truck Act of 1900 it is required that wages of workmen be paid in money; it being made illegal by the Acts to pay wages in goods, or to make any agreement to set off as wages the price of articles supplied; or for the employer to impose any condition, express or implied, as to the person, time, or place with whom, or when, or where, a workman's wages or any portion thereof are to be expended. No deduction may be made from a workman's wages for sharpening or repairing tools, except by agreement not forming part of the conditions of hiring; and when part of a workman's wages is —by agreement, custom, or otherwise—payable in advance, the employer is expressly forbidden by the Act to make any deduction for interest or poundage.

A deduction from the wages of a workman for a subscription to a sick club is illegal under the Truck Acts, but in a case where a workwoman had acquiesced in the payment out of her wages of such a subscription, the Court of Appeal held (1892) that she was debarred from recovering back the amounts so paid, the fund to which they were paid not being an unlawful one (*Hewlett* v. *Allen*, Weekly Notes, 139; see also Ex parte *Cooper*, 26 Ch. D., 693).

By the Liquor Act 1898 the payment of wages in any public-house, is prohibited, except by the resident owner or occupier of a public-house, beershop, &c., to workmen *bona-fide* employed by him.

Any employer infringing the Truck Act renders himself liable for a first offence to a penalty not exceeding £10; for a second offence, not exceeding £25; and for a third offence the offender may be fined any sum not exceeding £50. Penalties are recoverable before two justices.

# USEFUL TABLES AND MEMORANDA.

## LIFTING A STONE BUILDING.

As an example of what can be done in the direction of **underpinning**, the alteration recently made to a two-story **masonry structure** in Illinois (says the London *Builder*) is decidedly worthy of attention.

The building, used as a county courthouse, covers an area of nearly 10,000 square feet, the walls are about 60ft. high, and the roof is surmounted by a heavy dome. For the purpose of forming a new lower story, the entire structure was raised bodily by more than 12ft.

The mode of operation seems to have been particularly simple, and was as follows:—

Rectangular holes at short intervals were cut through all the outer and two cross walls, about 3ft. above the ground level.

Two or three 15in. steel I-beams were then inserted in each hole, the ends being supported on 12in. square timbers parallel with the walls.

The timbers in turn were set on 10-ton screw-jacks resting upon two 12in. square sills.

By the aid of a large gang of men the jacks were screwed up gradually until the whole building had been lifted 6in., when the load was transferred to timber beams placed on each side of the walls, these beams being shored up whilst cribwork was built beneath the jacks so that the next lift might be made.

When the structure had been raised 2ft. the old foundations were taken away, and a third crib was added and continuously built up as the work progressed.

Finally, the centre crib was removed, and in its place new foundations were formed, and new walls were carried up to the old work.

Each front of the building includes a massive portico, having four stone columns, each weighing about 50 tons. These porticos were raised together with the main walls by using longer steel beams at the necessary points. It is said that the work was successfully accomplished without cracking the masonry or causing any other structural injury.

## REMOVING RUST FROM IRON.

May easily be effected by immersing the article in a nearly saturated solution of chloride of tin, even if much eaten into. The duration of the immersion will depend upon the thicker or thinner film of rust; in most cases, however, 12 to 24 hours will suffice. The solution of chloride of tin must not contain too great an excess of acid, otherwise it will attack the iron itself. After the articles have been removed from the bath, they should first be washed in water, and then with ammonia, and be dried as quickly as possible. Articles treated in this manner assume the appearance of dead silver.

## TO TEST SOUNDNESS OF TIMBER.

Place the ear close to one end of the timber while attendant strikes the other end with a hammer. If the sound is ringing and clear, the log is good, but if dull there is some flaw or unsound spot.

**Prevent lead from spluttering in leading iron palisading into stone.**—Drop oil into hole or mould.

**To test iron or steel.**—A drop of nitric acid turns iron white, and steel black.

**Flux for soldering zinc**—Dissolve small pieces of zinc in muriatic acid, with water, double quantity.

**To toughen plaster casts** and prevent cracking, saturate them in hot glue and water—1 to 5.

**Never use tarred paper** under a tin roof. The acid in the tar destroys the metal.

**Place paper thick under tin** to prevent damage when laid on concrete.

**To hang a door that will rise** as it opens and also shut itself unaided, use a wider butt hinge at bottom than top of door.

### Measures and their Square Dimensions.

| | in. | | in. | | in. |
|---|---|---|---|---|---|
| 1 pint .. .. = | 4 | x | 4 | x | 2-1/10. |
| 1 quart .. .. = | 4 | x | 4 | x | 3-9/16. |
| 1 gallon .. .. = | 7 | x | 4 | x | 8½. |
| 10 ,, .. .. = | 14 | x | 15 | x | 11. |
| 31½ gallons—1 barrel = | 24 | x | 24 | x | 14.7. |
| ½ bushel .. .. = | 12 | x | 11.2 | x | 8. |
| 1 bushel .. .. = | 12 | x | 11.2 | x | 16. |
| 5 bushels .. .. = | 24 | x | 28 | x | 16. |

### Metres and Feet.

| | |
|---|---|
| 1 metre .. .. = | 3ft. 3.3704in. |
| 1 foot .. .. = | .304 metres. |

## MEASUREMENTS AND WEIGHTS OF COINS.

A bronze halfpenny measures exactly 1 inch in diameter—5 equal 1oz.
1 bronze penny measures exactly 1.2 inch in diameter—3 ,, ,,
1 shilling measures exactly 1 inch in diameter .. —5 ,, ,,
1 half-crown weighs ½ an ounce .. .. .. —2 ,, ,,

Term penny as applied to nails—

Three penny means 3 pounds to 1000 nails.
Eight penny means 8 pounds to 1000 nails.

The diameter of a circle multiplied by .8862 equals side of equal square in area.

The diameter of a circle multiplied by .7071 equals diameter inscribed square in circle.

The side of a square multiplied by 3.545 equals circumference of a circle of equal area.

The circumference of a circle multiplied by .2821 equals side of a square of equal area.

The diameter of a circle divided by 3.1416 equals circumference.

# BRITISH WEIGHTS AND MEASURES.

## Lineal Measure.

| | | |
|---|---|---|
| 7.92 inches | = | 1 link. |
| 12 inches | = | 1 foot. |
| 3 feet | = | 1 yard. |
| 6 feet | = | 1 fathom. |
| 5½ yards | = | 1 rod, pole, or perch. |
| 100 links | = | 66 feet = 1 chain |
| 220 yards | = | 40 poles = 10 chains = 1 furlong. |
| 8 furlongs | = | 80 chains = 1,760 yards = 5,280 feet = 1 mile. |
| 6,080 feet | = | 1 Admiralty knot. |

## Square Measure.

| | | |
|---|---|---|
| 144 square inches | = | 1 square foot. |
| 9 square feet | = | 1 square yard. |
| 30¼ square yards | = | 1 square, pole, rod, or perch. |
| 40 square poles | = | 1 rood. |
| 4 roods | = | 4,840 square yards = 1 acre. |
| 640 acres | = | 1 square mile. |

## Liquid Measure.

| | | |
|---|---|---|
| 8.665 cubic inches .. | = | 1 gill. |
| 4 gills .. .. | = | 1 pint. |
| 2 pints .. .. | = | 1 quart. |
| 4 quarts .. .. | = | 1 gallon. |
| 1 gallon .. .. | = | 277¼ cubic inches or 0.16 cubic foot. |
| 1 ,, .. .. | = | 10lbs. of distilled water. |
| 1 cubic foot .. | = | 6.232 gallons. |
| 1 cwt. water .. | = | 1.8 cubic foot. |
| 1 bushel .. .. | = | 1.28 ,, |

## Avoirdupois Weight.

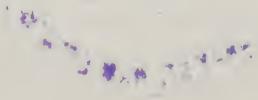
| | | |
|---|---|---|
| 27.344 grains .. .. | = | 1 drachm. |
| 16 drachms .. .. | = | 437½ grains = 1 ounce. |
| 16 ounces .. .. | = | 7,000 grains = 1 pound. |
| 14 pounds .. .. | = | 1 stone. |
| 28 pounds .. .. | = | 1 quarter. |
| 4 quarters .. .. | = | 112 pounds = 1 hundredweight. |
| 20 hundredweight .. | = | 2,240 pounds = 1 ton. |

## Troy Weight.

| | | |
|---|---|---|
| 24 grains .. .. | = | 1 pennyweight. |
| 20 pennyweights .. | = | 480 grains = 1 troy ounce. |
| 12 troy ounces .. | = | 5,760 grains = 1 troy pound. |

# THE HANDY READY RECKONER.

| No. | 1¼d. | 1½d. | 1¾d. | 2d. | 2¼d. | 2½d. | 2¾d. | 3d. | 3¼d. | 3½d. | 3¾d. | 4d. | 4¼d. | 4½d. | 4¾d. | 5d. | 5¼d. | 5½d. | 5¾d. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Art. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| 1 | 0 1¼ | 0 1½ | 0 1¾ | 0 2 | 0 2¼ | 0 2½ | 0 2¾ | 0 3 | 0 3¼ | 0 3½ | 0 3¾ | 0 4 | 0 4¼ | 0 4½ | 0 4¾ | 0 5 | 0 5¼ | 0 5½ | 0 5¾ |
| 2 | 0 2½ | 0 3 | 0 3½ | 0 4 | 0 4½ | 0 5 | 0 5½ | 0 6 | 0 6½ | 0 7 | 0 7½ | 0 8 | 0 8½ | 0 9 | 0 9½ | 0 10 | 0 10½ | 0 11 | 0 11½ |
| 3 | 0 3¾ | 0 4½ | 0 5¼ | 0 6 | 0 6¾ | 0 7½ | 0 8¼ | 0 9 | 0 9¾ | 0 10½ | 0 11¼ | 1 0 | 0 11¾ | 1 1½ | 1 2¼ | 1 3 | 1 3¾ | 1 4½ | 1 5¼ |
| 4 | 0 5 | 0 6 | 0 7 | 0 8 | 0 9 | 0 10 | 0 11 | 1 0 | 1 1 | 1 2 | 1 3 | 1 4 | 1 5 | 1 6 | 1 7 | 1 8 | 1 9 | 1 10 | 1 11 |
| 5 | 0 6¼ | 0 7½ | 0 8¾ | 0 10 | 0 11¼ | 1 0½ | 1 1¾ | 1 3 | 1 4¼ | 1 5½ | 1 6¾ | 1 8 | 1 9¼ | 1 10½ | 1 11¾ | 2 1 | 2 2¼ | 2 3½ | 2 4¾ |
| 6 | 0 7½ | 0 9 | 0 10½ | 1 0 | 1 1½ | 1 3 | 1 4½ | 1 6 | 1 7½ | 1 9 | 1 10½ | 2 0 | 2 1½ | 2 3 | 2 4½ | 2 6 | 2 7½ | 2 9 | 2 10½ |
| 7 | 0 8¾ | 0 10½ | 1 0¼ | 1 2 | 1 3¾ | 1 5½ | 1 7¼ | 1 9 | 1 10¾ | 2 0½ | 2 2¼ | 2 4 | 2 5¾ | 2 7½ | 2 9¼ | 2 11 | 3 0¾ | 3 2½ | 3 4¼ |
| 8 | 0 10 | 1 0 | 1 2 | 1 4 | 1 6 | 1 8 | 1 10 | 2 0 | 2 2 | 2 4 | 2 6 | 2 8 | 2 10 | 3 0 | 3 2 | 3 4 | 3 6 | 3 8 | 3 10 |
| 9 | 0 11¼ | 1 1 | 1 3¾ | 1 6 | 1 8¼ | 1 10½ | 2 0¾ | 2 3 | 2 5¼ | 2 7½ | 2 9¾ | 3 0 | 3 2¼ | 3 4½ | 3 6¾ | 3 9 | 3 11¼ | 4 1½ | 4 3¾ |
| 10 | 1 0½ | 1 3 | 1 5½ | 1 8 | 1 10½ | 2 1 | 2 3½ | 2 6 | 2 8½ | 2 11 | 3 1½ | 3 4 | 3 6½ | 3 9 | 3 11½ | 4 2 | 4 4½ | 4 7 | 4 9½ |
| 11 | 1 1¾ | 1 4½ | 1 7¼ | 1 10 | 2 0¾ | 2 3½ | 2 6¼ | 2 9 | 2 11¾ | 3 2½ | 3 5¼ | 3 8 | 3 10¾ | 4 1½ | 4 4¼ | 4 7 | 4 9¾ | 5 0½ | 5 3¼ |
| 12 | 1 3 | 1 6 | 1 9 | 2 0 | 2 3 | 2 6 | 2 9 | 3 0 | 3 3 | 3 6 | 3 9 | 4 0 | 4 3 | 4 6 | 4 9 | 5 0 | 5 3 | 5 6 | 5 9 |
| 13 | 1 4¼ | 1 7½ | 1 10¾ | 2 2 | 2 5¼ | 2 8½ | 2 11¾ | 3 3 | 3 6¼ | 3 9½ | 4 0¾ | 4 4 | 4 7¼ | 4 10½ | 5 1¾ | 5 5 | 5 8¼ | 5 11½ | 6 2¾ |
| 14 | 1 5½ | 1 9 | 2 0½ | 2 4 | 2 7½ | 2 11 | 3 2½ | 3 6 | 3 9½ | 4 1 | 4 4½ | 4 8 | 4 11½ | 5 3 | 5 6½ | 5 10 | 6 1½ | 6 5 | 6 8½ |
| 15 | 1 6¾ | 1 10½ | 2 2¼ | 2 6 | 2 9¾ | 3 1½ | 3 5¼ | 3 9 | 4 0¾ | 4 4½ | 4 8¼ | 5 0 | 5 3¾ | 5 7½ | 5 11¼ | 6 3 | 6 6¾ | 6 10½ | 7 2¼ |
| 16 | 1 8 | 2 0 | 2 4 | 2 8 | 3 0 | 3 4 | 3 8 | 4 0 | 4 4 | 4 8 | 5 0 | 5 4 | 5 8 | 6 0 | 6 4 | 6 8 | 7 0 | 7 4 | 7 8 |
| 17 | 1 9¼ | 2 1½ | 2 5¾ | 2 10 | 3 2¼ | 3 6½ | 3 10¾ | 4 3 | 4 7¼ | 4 11½ | 5 3¾ | 5 8 | 6 0¼ | 6 4½ | 6 8¾ | 7 1 | 7 5¼ | 7 9½ | 8 1¾ |
| 18 | 1 10½ | 2 3 | 2 7½ | 3 0 | 3 4½ | 3 9 | 4 1½ | 4 6 | 4 10½ | 5 3 | 5 7½ | 6 0 | 6 4½ | 6 9 | 7 1½ | 7 6 | 7 10½ | 8 3 | 8 7½ |
| 19 | 1 11¾ | 2 4½ | 2 9¼ | 3 2 | 3 6¾ | 3 11½ | 4 4¼ | 4 9 | 5 1¾ | 5 6½ | 5 11¼ | 6 4 | 6 8¾ | 7 1½ | 7 6¼ | 7 11 | 8 3¾ | 8 8½ | 9 1¼ |
| 20 | 2 1 | 2 6 | 2 11 | 3 4 | 3 9 | 4 2 | 4 7 | 5 0 | 5 5 | 5 10 | 6 3 | 6 8 | 7 1 | 7 6 | 7 11 | 8 4 | 8 9 | 9 2 | 9 7 |
| 21 | 2 2¼ | 2 7½ | 3 0¾ | 3 6 | 3 11¼ | 4 4½ | 4 9¾ | 5 3 | 5 8¼ | 6 1½ | 6 6¾ | 7 0 | 7 5¼ | 7 10½ | 8 3¾ | 8 9 | 9 2¼ | 9 7½ | 10 0¾ |
| 22 | 2 3½ | 2 9 | 3 2½ | 3 8 | 4 1¾ | 4 7 | 5 0½ | 5 6 | 5 11½ | 6 5 | 6 10½ | 7 4 | 7 9¾ | 8 3 | 8 8½ | 9 2 | 9 7½ | 10 1 | 10 6½ |
| 23 | 2 4¾ | 2 10½ | 3 4¼ | 3 10 | 4 3¾ | 4 9½ | 5 3¼ | 5 9 | 6 2¾ | 6 8½ | 7 2¼ | 7 8 | 8 1¾ | 8 7½ | 9 1¼ | 9 7 | 10 0¾ | 10 6½ | 11 0¼ |
| 24 | 2 6 | 3 0 | 3 6 | 4 0 | 4 6 | 5 0 | 5 6 | 6 0 | 6 6 | 7 0 | 7 6 | 8 0 | 8 6 | 9 0 | 9 6 | 10 0 | 10 6 | 11 0 | 11 6 |
| 25 | 2 7½ | 3 1½ | 3 7¾ | 4 2 | 4 8¼ | 5 2½ | 5 8¾ | 6 3 | 6 9½ | 7 3½ | 7 9¾ | 8 4 | 8 10¼ | 9 4½ | 9 10¾ | 10 5 | 10 11¼ | 11 5½ | 11 11¾ |



J. H. SODERBERG
BUILDER AND
CONTRACTOR
GRAY ST, HAMILTON

# Alphabetical List of Advertisers.


| | Page. |
|---|---|
| Asphaltum Co. of N.S.W.(Patent), Arkilite Paving and Damp-Proof Courses | 4, 5 |
| Bain's White Ant Exterminator Co., Ltd. | 20 |
| Bluestone Metal Co., Broken Concrete and Road Metal | 27 |
| Brady, Richard, Revolving Shutters | 7 |
| Bullivant's Australian Co., Ltd., Wire Rope and Blocks | 7 |
| Crane, G. E. & Sons, Marble, Lead, Tile, and Slate Merchants | 2 |
| Cross, G. T., Opalite Tiles, Slates and Plaster Importers, Agents | 9 |
| Cole, E. W., Technical, Building and Engineering Works | 29 |
| Commonwealth Portland Cement Co., Ltd., Union Cement, Limestone, and Concrete Pipes | 24 |
| Danks, John & Son, Pumps, Hydraulic Rams, Windmills, &c. | 21 |
| Duff, Thos., & Bros., Electroplaters and Shop Front Manufacturers | 14 |
| Eastway Bros., Wire Workers | 11 |
| Elliott, Maclean & Co., Expanded Metal and Lathing | 6 |
| Fowler, Robert, G.E. Pipes, Pottery and Sanitary Pans | 8 |
| Grant & Cocks, Fibrous Plaster Ceilings and Enrichments | 22 |
| Goodlet & Smith, Ltd., Timber, Joinery, Tiles, Cement and Glass and Pottery | 3 |
| Hordern, Anthony & Son, Builders' Ironmongery and Requisites | 25 |
| Hughes, W. H. & Co., Ironite Paving, Steps and Nosings | 26 |
| Kiama Road-Metal Co., Ltd., Broken Concrete, Metal and Screenings | 27 |
| Ludowici, J. C. & Son, Ltd., Leather Machine Belting and Pump Cups | 28 |
| Saxton & Binns, Ltd., Timber, Joinery Mills | 23 |
| McKenzie, H., Ltd., Timber Merchants and Exporters | 20 |
| Sandy, James & Co., Paint, Glass, and Wall-Paper Merchants | 12 |
| Shaw, John, Ltd., Contractors' Wire Ropes, Blocks, Aland's Ventilators, Lightning Conductors | 19 |
| Sheffield Manufacturing and Plating Co., Metal Shop Fronts, Fitters and Electroplaters | 11 |
| Slee's Cooking Stoves and Ranges | 28 |
| Tyree, Ltd., Acetylene Gas Plants, Sprays, Plaster Ceilings | 13 |
| White Bay Constructional Steel and Iron Works | Outside Cover |
| Warburton, Franki & Co., Electrical Builders' Requisites and Engines | 15 |
| Ward, James, Stove Manufacturer and Hot Water Fitter | 18 |
| Wunderlich Patent Ceiling and Roofing Co., Ltd., Steel Ceilings, Stamped, and Metal Work | 16 |
| Terra Cotta, Tiles, Slates, Fire Sprinklers | 17 |
| Wormald Bros., Grinnell Fire Sprinklers, Fire Proof Doors | 10 |
| " Younger " Cooking Stoves and Ranges | 27 |

# Classified Index of Advertisments.


| | Page |
|---|---|
| Acetylene Gas Generators, &c., Tyree | 13 |
| Arkilite Paving, Asphalte and Bitumen | 4, 5 |
| Belting and Pump Leathers | 28 |
| Blocks, Pulleys, Wire Ropes, Metal and Bluestone Metal | 7, 19 |
| Brass Shop Fronts | 11, 14 |
| Builders' Ironmongery and Requisites | 2, 25 |
| Cement, Commonwealth, &c. | 24 |
| Concrete Slabs and Paving, Patent | 4, 26 |
| Constructional Ironwork, White Bay Works | Cover |
| Damp Courses | 2, 3, 5, 13, 25 |
| Drain Pipes and Pottery | 3, 8, 24 |
| Electrical Appliances and Requisites | 15, 25 |
| Expanded Metal and Lathing | 6 |
| Engineers, Hydraulic | 21 |
| Electroplaters | 11, 14 |
| Fibrous Plaster | 13, 22 |
| Fire Brick, Fire Clay | 2, 3, 8 |
| Fire-Proof Doors, Hydrants | 10, 16, 21 |
| Florite, Opal Wall Tiling, &c. | 9 |
| Glass Merchants | 3, 12, 23, 25 |
| Grinnell Fire Sprinklers and Fire-Proof Screens | 10 |
| Hot Water Fitters | 18, 21 |
| Joinery Mills | 3, 20, 23 |
| Iron Bridges, Joists and Girders | Cover |
| Iron Founders' Merchants | 2 |
| Mantel Pieces and Over Mantels | 2, 3, 23, 25 |
| Marble Merchants and Importers | 2, 25 |
| Metal Workers and Ceilings | 2, 10, 11, 14, 16, 21 |
| Opal Wall Tiling | 2, 9, 25 |
| Painters, Paper-hangers and Glaziers' Requisites | 12 |
| Pavings, Patent | 5, 26 |
| Sanitary Pans and Fittings | 2, 3, 8 |
| Pumps, Windmills, Pulsometers, Rams | 21 |
| Revolving Shutters (Patent) | 7 |
| Steel Ceilings and Stamped Metal Work | 2, 10, 17, 25 |
| Stoves, Ovens, and Kitchen Ranges | 18, 27, 28 |
| Slate Merchants | 2, 9, 17 |
| Telephones | 15, 25 |
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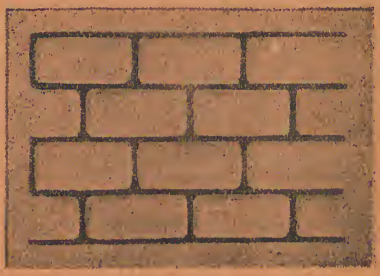

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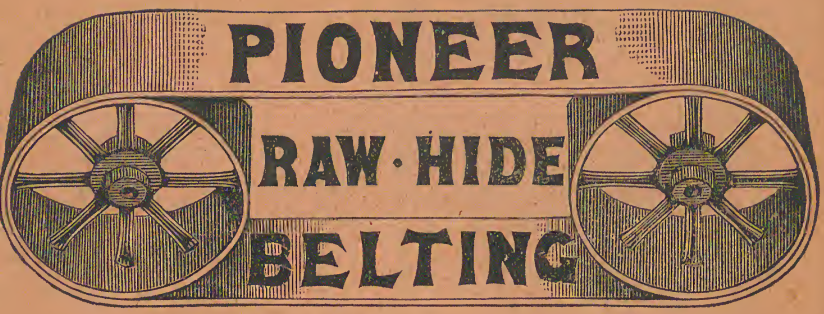


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